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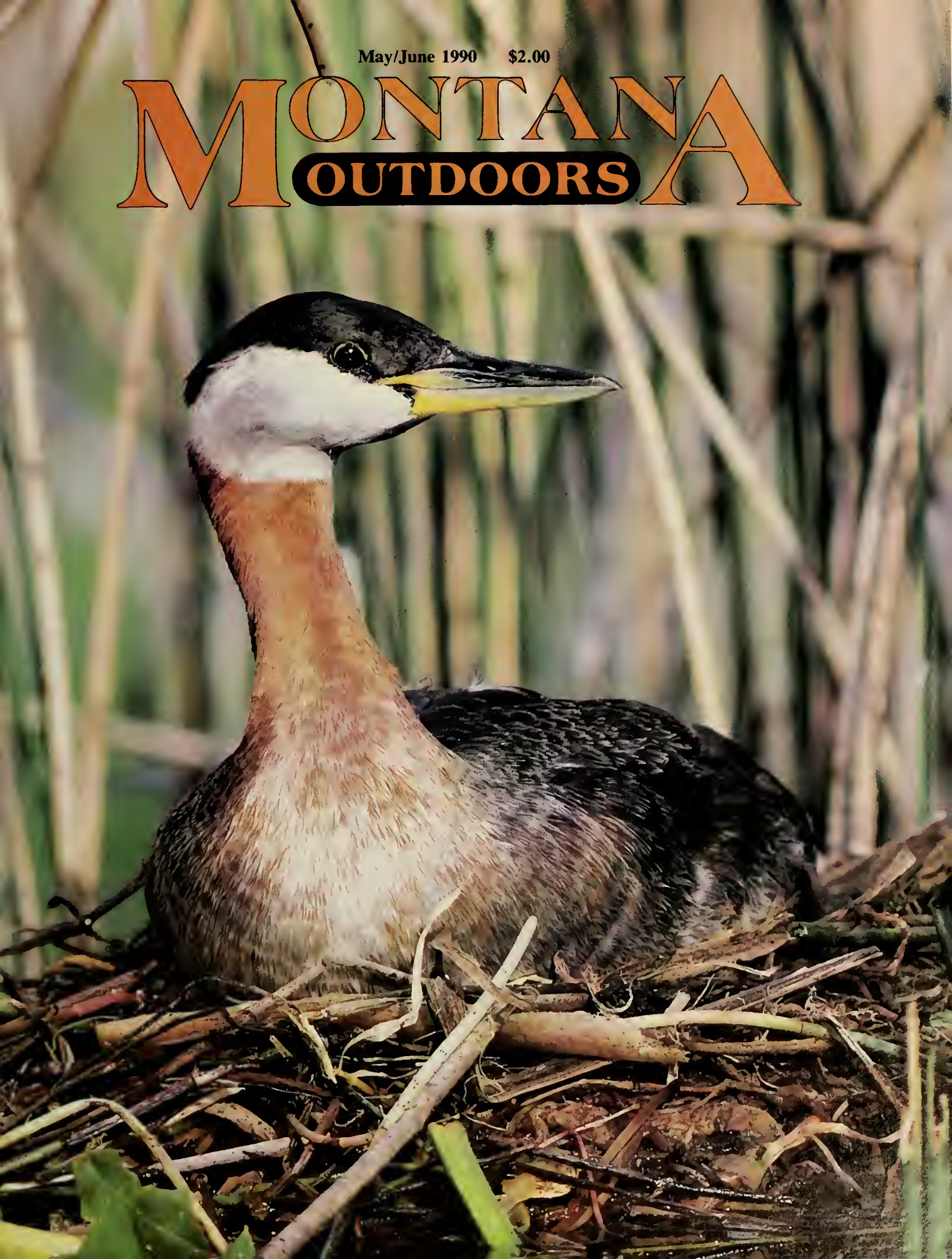
MONTANA OUTDOORS



OUR POINT OF VIEW

EXCITING AND ENCOURAGING THINGS ARE HAPPENING as the Governor's State Park Futures Committee's work gains momentum.

During the month of March, the committee began its public involvement phase using a statewide newspaper questionnaire and meetings conducted in 15 cities. Nearly 500 Montanans participated in the meetings, 300 answered the questionnaire, and many others sent letters, telephoned, or visited with committee members and department employees to express their views.

Early findings indicate that respondents generally agree with the committee's preliminary vision: "...An affordable state park system that can preserve Montana's natural and cultural resources and stimulate the state economy by providing high quality recreational opportunities that are accessible to Montanans and our visitors."

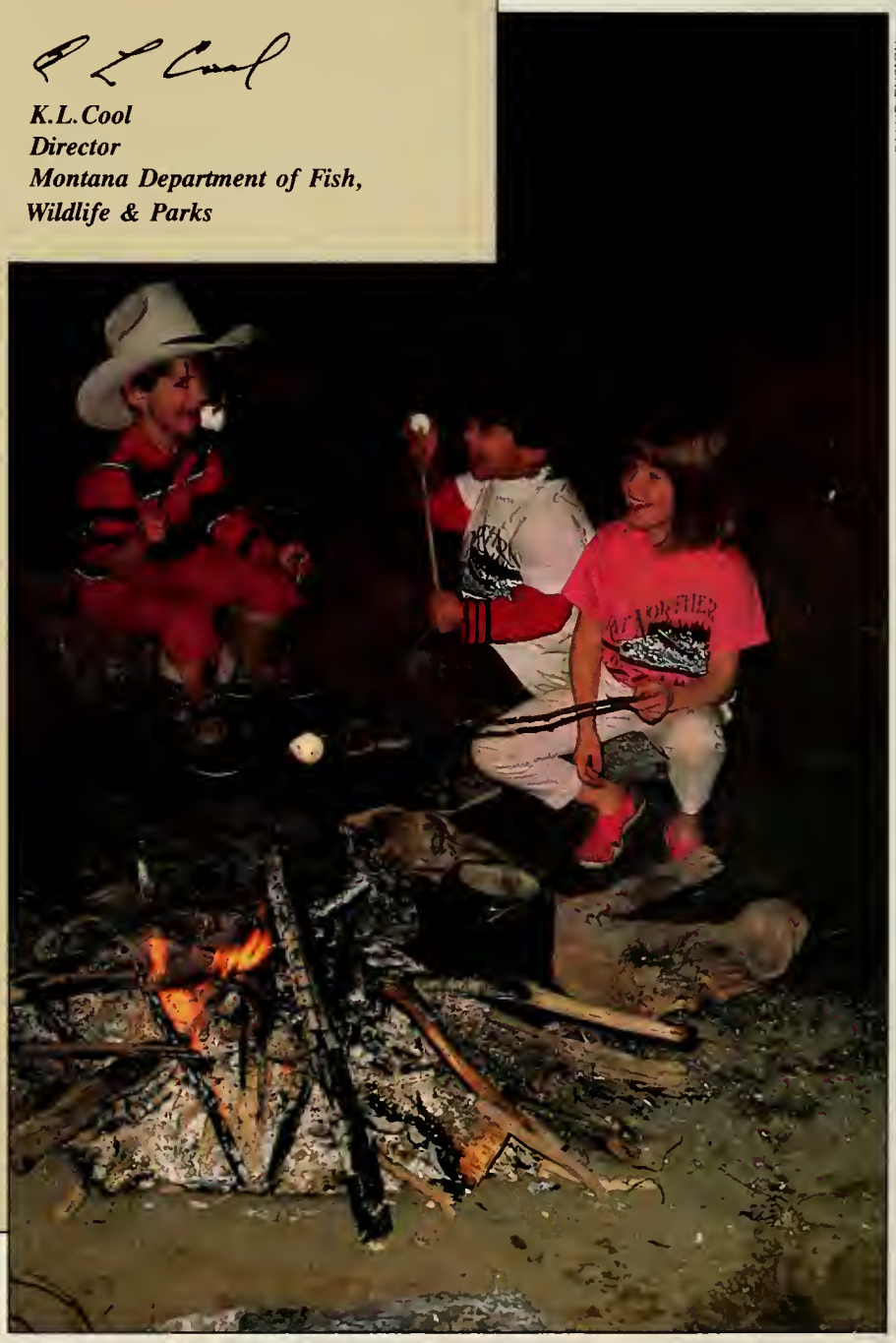
The committee has also received a wealth of suggestions about funding; long-range planning; resource protection; tourism; image enhancement; park selection, development, and management; and other subjects.

Beginning in May, the committee will tour a number of parks throughout the state to gain a firsthand understanding of park resources, management, issues, and options. This will be another opportunity for recreationists to visit with committee members. Their schedule will be announced through local media. Park managers look forward to hosting the committee's park visits and hope to see you there as well.

The final report will be drafted over the summer and presented to Governor Stan Stephens and members of the 52nd Legislature.

Governor Stephens and I appreciate the work of the members of the State Park Futures Committee. We are counting on the committee, with your help, to tell us what Montanans want our park system to become as we move toward the 21st century.

K.L. Cool
Director
Montana Department of Fish, Wildlife & Parks



DIANE ENSIGN

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MONTANA OUTDOORS

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Back Cover—If we ran a contest to pick Montana's "prettiest spot," Flathead Lake near Bigfork would surely amass many votes. **Barbara Thomas'** back cover shot captures the combination of water and light that help create the area's magic.

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Developments at Dancing Prairie

by Mike Aderhold

DURING THIS CENTURY, POPULATIONS OF THE COLUMBIAN RACE of sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) have spiraled downhill.

The sharptail subspecies once lived throughout the Intermountain West in 10 states and provinces, from British Columbia to Colorado (see map). In California, the Columbian sharptail was last seen in 1920; in Nevada, 1952; and Oregon, 1969.

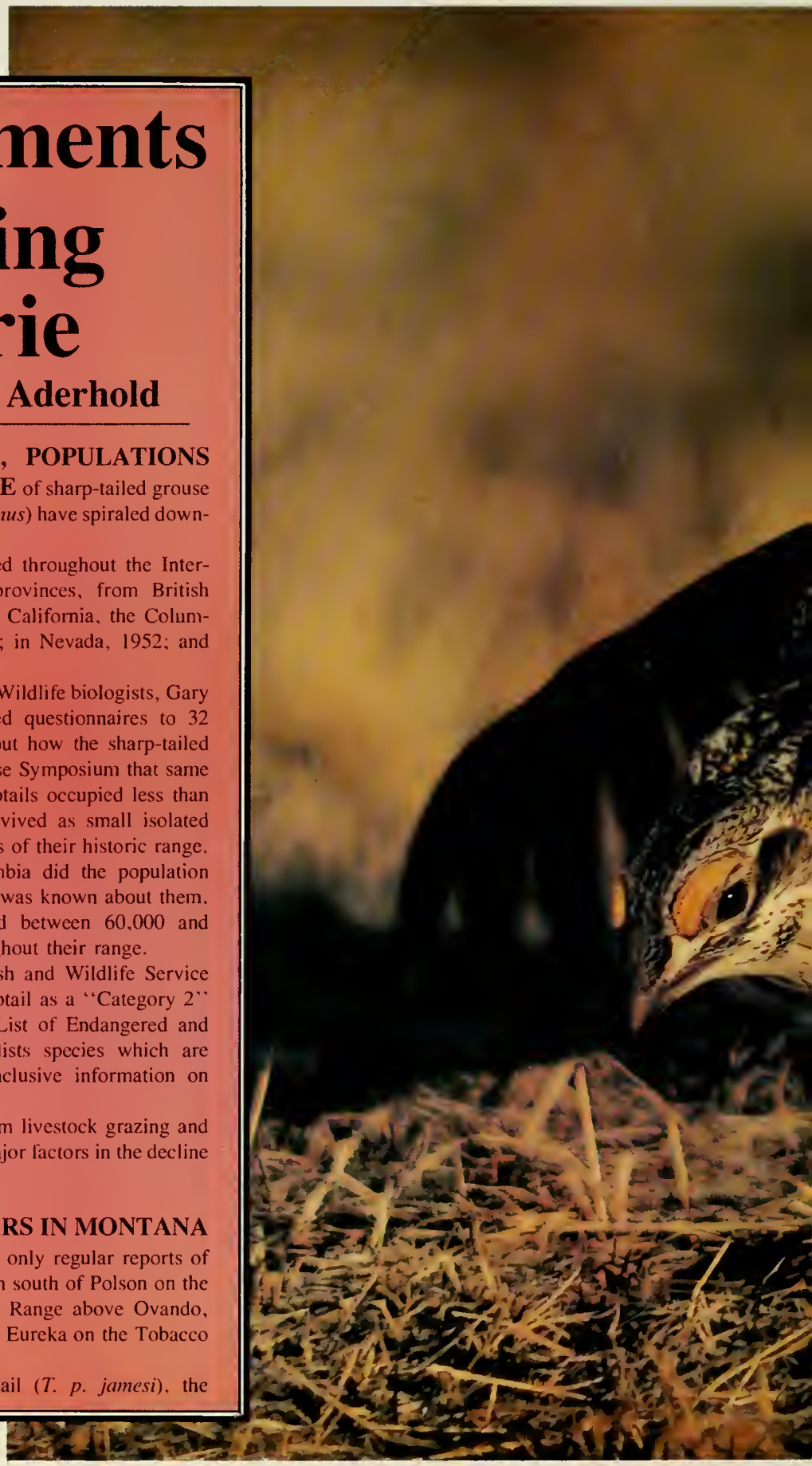
In 1980, two Colorado Division of Wildlife biologists, Gary Miller and Walter Graul, distributed questionnaires to 32 states and provinces to try to find out how the sharp-tailed grouse was doing. At a Prairie Grouse Symposium that same year, they reported Columbian sharptails occupied less than 10% of their former range and survived as small isolated populations in the southern two-thirds of their historic range. Only in south-central British Columbia did the population appear secure—and there, very little was known about them. The Colorado researchers estimated between 60,000 and 170,000 Columbian sharptails throughout their range.

On January 6, 1989, the U.S. Fish and Wildlife Service (USFWS) listed the Columbian sharptail as a "Category 2" candidate for addition to the U.S. List of Endangered and Threatened Wildlife. (Category 2 lists species which are becoming rarer, but for which conclusive information on vulnerability is not available.)

Modifications of native habitat from livestock grazing and grain farming are thought to be the major factors in the decline of Columbian sharptails.

DURING THE LAST 25 YEARS IN MONTANA WEST OF THE DIVIDE, the only regular reports of Columbian sharptails have come from south of Polson on the Flathead Reservation, in the Garnet Range above Ovando, Helmville, and Drummond, and near Eureka on the Tobacco Plains.

By comparison, the plains sharptail (*T. p. jamesi*), the



ALAN NELSON

subspecies inhabiting eastern Montana, is abundant throughout most of its historic range, and populations appear stable. The Colorado researchers estimated a total plains sharptail population of about 3 million birds. These sharptails live on the Great Plains where for thousands of years prairie vegetation developed with and adapted to large herds of big grazing mammals, particularly bison.

In the Intermountain area, however, thin soils, dry weather, and lack of heavy grazing by bison allowed development of grasslands far different from those on the Great Plains. To the south, a series of plant communities with a sagebrush overstory and perennial bunch grass understory developed. In the Columbia Basin, a palouse prairie dominated by bunch grasses (wheatgrasses and fescues) evolved. Over a long period, Columbian sharptails adapted to this environment.

Native bunch grass lacks the resilience to cope with concentrations of domestic livestock. By the mid-1880s, excessive grazing destroyed large portions of the native bunch grass. The perennial bunch grasses simply could not renew their energy reserves each spring before grazing began again. The plants could not flower and produce seeds, and over time lost vigor and began to disappear.

After the severe winter and cattle die-offs of 1889, settlers began to scramble for sites that could be irrigated so they could produce hay for winter forage. This started the permanent alteration of the Intermountain grasslands. The bankruptcy of many cattle ranches opened rangelands to development of a sheep industry. Using snow for water, sheep were more adaptable than cattle and could winter better on open range, further impacting the fragile Intermountain vegetation.

In the first decade of the 20th century, national forests were established and larger, federally funded irrigation projects were developed. The process of establishing irrigated homesteads was hard on surrounding rangelands, and they became vulnerable to a host of weeds such as thistles, mustards, and cheatgrass.

From 1900 through the '30s, the grasslands of the Intermountain area suffered one disaster after another—drought, grasshoppers, crickets, devastating wildfires.

During World War II, a program was started to reseed ruined ranges with crested wheatgrass, a perennial bunch grass from Russia. These plantings succeeded beyond anyone's expectation, but displaced thousands of acres of native vegetation and many small mammal and bird populations. After World War II, range managers experimented with a variety of herbicides and pesticides, developed during the war, to control noxious weeds and problem insects. The by-product of some of these experiments was a further reduction of native plants and animals.

Almost unnoticed, the Columbian sharptail disappeared. The pioneers had seen them and wrote about their great numbers; the next generation noticed they were becoming rare; the third generation recorded they were no longer present. The environment they had adapted to over the centuries was also just about gone.

TODAY, THE ONLY WELL-DOCUMENTED POPULATION of Columbian sharptails in Montana lives in a grassland area called the Tobacco Plains, between the town of Eureka and the Canadian border. Before 1960, the only recorded observations of Columbian sharptails in this area were made between 1921 and 1932. The sharptails were observed by the legendary and still active bird-watcher and former State Senator Winton Weydemeyer on his ranch 12 miles southeast of Eureka. The Montana Department of Fish, Wildlife & Parks records on grouse in the area only go back to 1960. Since 1966, U.S. Forest Service and FW&P biologists have conducted annual counts on two sections of land that contain the only surviving dancing ground (lek). In recent years, these lands have been referred to as the "Dancing Prairie."

In 1976, researcher Charles Jonkel and several University of Montana students took an interest in the area and collected

MIKE ADERHOLD

Sharptails gather at traditional dancing grounds, or leks, each spring, where males defend small territories and compete with each other for mating opportunities. The height of this display occurs in April and May.

information for the next four years. One of the students, Robin Bown, wrote a 42-page senior thesis on the status of the sharptails. Bown reported that four leks had been active at some time during the 1970s. By spring of 1979 and 1980, however, the sharptails were using only two leks. The number of birds at one lek varied between 15 and 20 and the number at the other was a fairly constant 10.

Based on other grouse studies, Bown estimated about 40 sharptails were in the area. From conversations with long-time residents, she concluded that the number of grouse had declined during the 1970s. Bown speculated that, in addition to the impact of cultivation and grazing, the spraying of grasshoppers with dieldrin in the early 1970s and several unusually cold, wet springs could have affected the nesting success of this relic population enough to cause its decline.

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Some Grouse Background...

There are ten members of the grouse family (Tetraonidae) in North America. Five species are called grouse (sage, blue, spruce, ruffed, and sharp-tailed), three ptarmigans (willow, rock, and white-tailed), and two prairie chickens (greater and lesser).

Six of these 10 species are Montana residents: white-tailed ptarmigan, and sage, sharp-tailed, blue, ruffed, and spruce grouse. Each has a number of distinctive characteristics, but all are chickenlike in shape and have short, curved bills, rounded wings with 10 primary feathers, feet with four toes and strong nails, and all are capable of strong but relatively short flight. Their young are down covered and are usually able to fly short distances in less than two weeks.

Grouse differ from pheasants, turkeys, partridge, and quail in having a short hind toe elevated from the front

three, nostrils with a feather covering, and feathered legs. All grow "snowshoes" in late fall. In ptarmigan, these "snowshoes" are formed by a dense mat of stiff feathers on the toes. In other grouse, the toes have marginal 2-3mm, comblike membranes called pectinations.

Sharp-tailed grouse occupy a huge area in North America (see map). They are found from north-central Alaska and the Mackenzie River Valley south to New Mexico, and from central British Columbia to Michigan's upper peninsula and western Quebec. The bird has adapted to a variety of grassland conditions.

Six races or subspecies of sharp-tailed grouse are recognized. Three are northern birds which have not been well studied: the Alaskan sharptail, the northwestern sharptail, and the northern sharptail. These birds have adjusted to the forest openings and brushy habitats of the boreal forest from Alaska across northern Canada to the Hudson Bay lowlands.

Farther south, the Columbian sharptail lives generally west of the Continental Divide, from the sagebrush semidesert country of the Great Basin north to the palouse prairie country of southern British Columbia. The plains sharptail is a bird of the Great Plains, from the mountain foothills of Montana and Alberta through the short grass prairie of the Dakotas and Saskatchewan. The prairie sharptail is the grouse of the upper Midwest, the tall grass prairie, oak savannas, and mixed deciduous-coniferous forests of southern Manitoba and Ontario.

The sharp-tailed grouse is distinguished by its pointed, white-edged tail, white spotted wings, and the V-shaped brown markings on its breast feathers. Both sexes are similar in size, with adults ranging between two and two and a half pounds.

The most conspicuous aspect of the life history of sharptails is their mating system. The sharptail is a true lek species—they come to a traditional dancing ground, and the males defend small territories and compete with each other for mating opportunities. A few males at or near the center of the assemblage do most of the breeding. The height of this display occurs in April and May when females visit the dancing grounds and presumably choose among males for a suitable mate.

The males "dance" with tails erect, wings outstretched, heads low and forward, with a series of rapid, stepping movements, tail-rattling, and chickenlike cooing, cackling, and whining. There is also a lot of posturing, bowing, flutter-jumping, and aggressive charging.

After breeding, females leave the dancing grounds to initiate egg laying. Eggs are laid at the rate of one per day, and the average clutch is 12. Incubation begins with laying of the last egg and continues for about 24 days. The young usually hatch on the same day and immediately start feeding on insects and sprouting wildflowers. Adult sharptails prefer brushy cover and in the fall eat rose hips, buffaloberry, snowberry, grains, the leaves and fruits of a variety of wildflowers and shrubs, and insects if available.

During the last 15 years, the popularity of sharptails with Montana hunters has grown. In eastern Montana, where they are relatively common, 50,000 to 75,000 are harvested annually, second only to ring-necked pheasants and Hungarian partridge in the state's upland bird hunt.

The male Columbian sharptail shown below was one of 14 captured near Kamloops, B.C., and released at Dancing Prairie Preserve in northwestern Montana in spring of 1987. The preserve was established by The Nature Conservancy to help maintain Columbian sharptails as well as to protect *Silene spaldingii* (opposite), an endangered element of the native palouse prairie.

DON SIAS

TIM MANLEY

IN 1983, THE BONNEVILLE POWER ADMINISTRATION, under direction of the Northwest Power Planning Council and authority of the Pacific Northwest Electric Power Planning and Conservation Act of 1980, contracted with FW&P to study the impact of the Libby Dam Project on wildlife. After two years, research biologist Chris Yde concluded that Libby Reservoir (Lake Koocanusa) inundated 3,917 acres of Columbian sharptail habitat.

Previous mitigation projects, particularly the 1978 Corps of Engineers acquisition of the 1,400-acre Kootenai #3 Wildlife Management Area uphill from Dancing Prairie, left 3,116 acres still uncompensated. The wildlife assessment report recommended habitat protection and/or enhancement on 3,116 acres in the Tobacco Plains and monitoring of the sharptails to check their response. Enhancement could include controlled grazing, prescription burning, and planting desirable shrubs (hawthorn, wild rose, chokecherry bushes, and aspen and birch trees) for winter sharptail food. Protection could occur through cooperative management agreements on state lands and conservation easements for private lands near Dancing Prairie.

The focus of the 1980 Northwest Power Planning Act was to overcome the wasteful and expensive wildlife and power arguments of the 1970s by better balancing wildlife and energy values. For wildlife, one concept is to mitigate or compensate for the unaddressed impacts of hydroelectric developments like the Libby Dam Project (see "In Search of a Better Balance" in the Sept./Oct. 1986 issue of *Montana Outdoors*). Funding for this program comes from the 8 million electric rate payers in the Pacific Northwest.

MEANWHILE, IN 1985, THE NATURE CONSERVANCY, a private organization founded in 1951 with over 440,000 members and with a mission to preserve biological diversity by protecting natural lands and the life they harbor, took an interest in Columbian sharptails and a rare plant, *Silene spaldingii*, found on the Tobacco Plains. This organization has expertise in real estate transactions and the financial ability to acquire land and develop conservation easements. The Nature Conservancy often works with the Natural Heritage Programs established by about 30 states. In Montana, the Natural Heritage Program was organized in 1985; this small group uses computers and information from

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Musings of a Tour Guide

by Leslie Rickey DeVos

HIGH ATOP CAVE MOUNTAIN in the London Hills of western Montana lies the entrance to Lewis and Clark Caverns State Park. Although not a lava series, these caverns are acclaimed because of the number and variety of formations (speleothems). The state of Montana works to keep the caverns natural and in so doing tries to preserve their original aspect. What follows are the musings of a tour guide who spent hundreds of hours, alone and with friends, in these alluring and spell-binding rooms.

AS I BEGIN THE ASCENT to the cavern entrance, I look out over the London Hills, the Jefferson River, and the canyon. It is early in the year, and the air is brisk, yet the sun feels warm on my back. The vegetation is not that of a well-groomed city park. Natural grasses, pon-

derosa pine, and prickly pear lend Old West flavor and remind me of the caverns' recent past.

Looking down at the Jefferson River, I imagine I see Meriwether Lewis and William Clark canoeing westward, searching for the treasures this great new land has to offer yet unaware of one of its greatest wonders fewer than two miles away from the river.

I cast my mind farther back in time and imagine bands of warriors and hunters meeting at this sacred canyon, awed by the vapor rising from the cavern entrance and not daring to enter. A train passes below, and my mind shifts to the early 1900s and the first hardy tourists who came out by train from Butte or Bozeman. They had to climb the steep hill from the limestone quarry below—and then they had to make the treacherous vertical descent into the caverns by ropes and wire ladders. I think about them exploring the upper rooms, inhibited by their Victorian garb, their way lit only by candles held in tin cans.

The Jefferson River Canyon is a reminder of the caverns' more distant past. Montana was once part of a shallow inland sea, and the shellfish which lived here provided raw material for nature's masterpiece. Deep within the earth, layers of limestone were protected for millions of years. They were then forced dramatically upward at a steep angle in two separate episodes of mountain-building. I wonder if the limestone forced up at this steep angle between two faults in the mountains could have caused the plethora of formations which makes these caverns unique. Stress would cause many cracks and fissures, and the carbonic acid formed from groundwater and carbon dioxide would make an ideal sculpting medium. As a sculptor tediously chips away at a mass to shape his art, so this acid seeps into these fractures, slowly dissolving the limestone, eroding and loosening larger chunks which fall to the cavern floor. The mixture of the dissolved calcite and carbonic acid is also the frosting on the cake, decorating the sculpture with myriad stalactites, stalagmites, columns, and smaller formations.

I PAUSE AT THE CAVERN ENTRANCE as a cool breeze blows up the canyon and ruffles my hair. When someone has to walk through the caverns to pick up stray bits of litter or check lights, I volunteer because I relish the time alone. I turn and enter the caverns through an iron gate which creaks as I close it behind me. I stop at the original entrance and contemplate the contrast of the blue sky and light, delicate clouds against the dark strength of the caverns' interior. I turn and begin my descent. No longer is it a treacherous climb but a paved floor, pounded flat by the feet of thousands of visitors each year.

The rail is moist and cool to my touch, since the caverns' temperature is around 50° year-round. Although the trail is softly lit, my eyes must adjust to the dim light. As I go deeper into the caverns, I dwell on their age and majesty.

As I descend into the Room of the Spiral Staircase, calcite formations decorating the walls make the room look like a Gothic cathedral. I can almost hear a mighty choir, chords swelling upward toward the light. I make my way through small, tight passages called Beaver Slide and the Backscratcher. Thinking dwarfs and elves would be at home in these passages, I give lighthearted deference to early tour guides' tales of such fanciful creatures.

I emerge into the Cathedral Room where a reverent quiet prevails. I once guided a college choir through the caverns and they asked to sing in this room. As their voices filled the space, it seemed as if we had been transported to some other time and place.

The high arch which gives the Cathedral Room its name also gives it cathedral-like acoustics. But the arch is more than symbolic. It tells me this room is safe. No more "breakdown," as the speleologists call the huge boulders which fall from the ceilings of caves. The Cathedral Room is stable. From my guide training, I remember I would be safer here than on the earth's surface. Truly, this is a sanctuary.

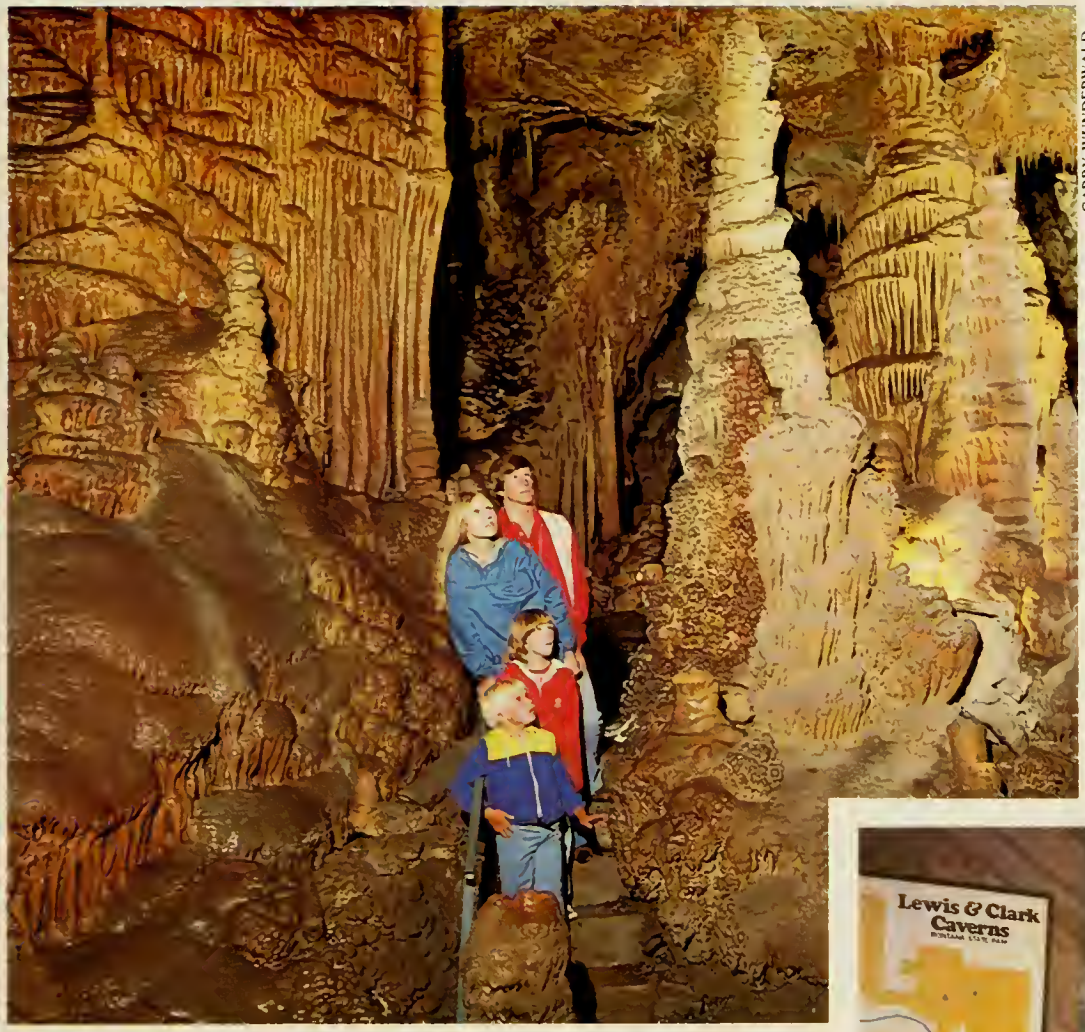
SURVEYING THE FORMATIONS, I find everything from the mighty to the whimsical. An active stalagmite, Old Faithful, receives one drop of groundwater into its splash cup (a small indentation in the top of the formation) every few seconds. A great column, the Fallen Idol, lies broken on the floor. This giant reminds me I am not the first to entertain both spiritual and fantastic musings as I wander these rooms.

Other formations are named to entertain the young and the young at heart. The Cave Lovers stand on Lovers' Leap, ready to meet their fate. Later, in the Lower Cathedral Room, one can see the same formations from another angle, and they look like an old woman and an old man in a wheelchair. "They've been thinking about leaping for a long time," we guides quip.

Now at the bottom of the pit, I gaze upward. This room and the Room of the Spiral Staircase are actually one deep, narrow room. I can envision the wooden staircase, beginning to deteriorate from the humidity, and adventurous tourists making their way down it. The formations in this room are less active—groundwater no longer finds its way here to cause the formations to grow. Permanent damage to this room may have resulted from the Spiral Staircase burning in the early 1950s or from construction of man-made tunnels which altered natural air flows.

The rest of the caverns are active, growing, with humidity ranging from 80% to 90%, but the bottom of the pit seems damaged, dead. I ponder the fragility of this natural wonder and how man's presence has changed it. Each year, thousands of visitors pass through. Paved walkways and cement staircases make their passage easier. Trails are tastefully lit, and some formations are illuminated by display lights. The combination of light, water, and spores carried in on shoes has resulted in some algae growth. Some of these algae patches are quite beautiful, but they are another reminder of man's impact on the caverns.

There is other evidence of man's presence. When visitors touch calcite formations, they leave behind an oil deposit from their hands. Over time, this builds up and the calcite becomes polished. The formation is no longer able to grow, since the calcite solution cannot adhere to it. Caverns managers have tried to educate the public not to touch formations, but several entrances and exits utilize formations as handholds, and some visitors simply must touch. Although this ecosystem is carefully controlled and managed,



GARRY WUNDERWALD

RICHARD B. ARAM

BRETT HAMILTON

Lewis and Clark Caverns, formed more than a million years ago by the action of acidic water on limestone, are a showcase of nature's forces. Stalactites, stalagmites, columns, and other calcite formations decorate the many rooms and passages.

man is very much a part of it.

THE CAVERNS ARE CONSIDERED "LIVING" CAVES. The humidity and activity of the formations attest to this, but so does the fact that these are considered "breathing" caverns. Fresh air moves through the caves, and visitors sometimes feel a fresh, gentle breeze. This breeze is not from the exit tunnel. When that tunnel was blasted, a drying wind roared through, threatening the ecosystem. Secure doors were installed at each end of the tunnel and they are never opened at the same time, thus protecting the caves from drying winds. The "breath" comes from another entrance—its location and many other mysteries about this natural phenomenon remain.

Humidity, activity, air circulation—relatively formal terms for scientific geologic processes. Growing, living, breathing—more commonplace phrases one hears scientists use just as often when talking or writing about these caverns. More and more, science and myth are melded into one train of thought. We are only beginning to explore the Gaia principle—the idea of earth as a living organism. To speak of a living, breathing cave is to speak of a living, breathing earth. I recall the words of Chief Seattle: "...What befalls the earth befalls all the sons of the earth. This we know: The earth does not belong to man, man belongs to the earth. All things are connected like the blood that unites us all. Man did not weave the web of life, he is merely a strand in it. Whatever he does to the web, he does to himself."

Leaving the bottom of the pit, I make my way through man-made tunnels and stairs to the Halfway Room. A small wooden plug in the ceiling serves as a survey marker, showing the halfway point on the developed tour. I think of the young men who put it there while building the tunnels I've just come through. The

Civilian Conservation Corps (CCC) developed much of the park and the caverns during the Great Depression of the 1930s (see "Wonder Underground: Lewis and Clark Caverns and the CCC," *Montana Outdoors*, July/August 1981). Not only are the caverns a repository of local, regional, and geologic history, I muse, but also of the history of the United States.

I am now in the Garden of the Gods, a long, narrow, open room. A graceful man-made staircase gradually descends the full length of the room. The atmosphere is ethereal. The shape of the room and the random placement of the formations make me feel as if I were walking through a long, enclosed garden, rather than standing in a room.

I begin my descent and pause to peer down into the Crystal Pool. No algae marks the purity of the water. I shine my light down into it—it seems separate, pure, untouched. A part of the caverns, certainly, and yet a part of something larger. Reverently, I return to the trail.

Standing alone on the stairway, I think of the groups I have guided through the Garden of the Gods. I usually leave them to their own thoughts for this part of the tour. I find they quietly make their way through columns and stalagmites that seem to be statues of ancient deities. There is little laughter, and people keep their voices low. I realize I am not the only one affected by these spiritual surroundings.

FROM THE GARDEN OF THE GODS, I pass through a tight man-made passage into the Brown Waterfall Room. The Brown Waterfall dominates the opposite wall. Most of the formations here are colored by minerals, primarily iron oxide. The Brown Waterfall, a large formation of flowstone (formed when mineral-laden water flows down a wall) resembles a lavish falls the color of deep rich milk chocolate. It is complemented by a smaller flowstone specimen, the Bronze Waterfall. Other formations in this room are colored black by manganese.

At this point in our tour, we let visitors experience total darkness. To momentarily enjoy the darkness and solitude, I breathe deeply and switch off my miner's lamp. Nevertheless, I'm glad to have the lamp with me as I turn it on again and head toward the next passage.

The lower portions were discovered later than the rest of the caverns. During development in the 1930s, some of the CCC workers broke through a small opening near the Brown Waterfall to a maze of passages that led to the Paradise Room, the largest room in the caverns. The tunnels I now walk through partially follow those original passages. Some are tight and narrow; others are wider, open walkways. I pass Bridal Veil Falls. The pure white flowstone is tastefully illuminated and seems at once pristine and regal, a falls frozen in time. A smaller display of formations decorated by algae is almost elfin.

Now at the lowest point on the tour, I stop. A large boulder is poised over my head, seemingly unsupported, but actually wedged solidly between the narrow cavern walls. I study the calcite crystals and boxwork pattern in the limestone. The boxwork was created when crystals formed in intersecting cracks in the limestone and fell away, leaving their imprint.

I ascend the steep, hand-carved stairs to the Paradise Room. Carved directly from the calcite or travertine, each beautiful stair shows many thin bands of orange and brown—the growth rings of the cavern.

I emerge into the Paradise Room. The angle of the walls creates an optical illusion, and this room is much larger than it appears. A stalagmite which seems to be about three feet tall is actually six feet. This knowledge corrects the optical illusion, and I realize the immensity of the room. As at the beginning of my walk, I can imagine the perfect blending of a hundred voices, swelling to fill the room. Pipe Organ Column dominates one wall. A flight of fancy overtakes me. Could the massive flowstones be providing the music I hear in my mind? I survey the mighty columns, touching each with my little beam of light. Atlas Column, Empire State Column, Half and Half Column—because of its coloring, each is well named. If I discovered the caverns today, I would choose these same names.

AMY SMITH

The Crystal Pool, in a room called Garden of the Gods, seems pure and untouched.

It is time to go. As I leave Paradise Room, I shine my light on a stalactite, broken during the blasting of the exit tunnel. There is new growth—a smaller stalactite grows from the broken end—earth's promise that while man may visit the caverns, he will not subdue them.

As I close the first door of the exit tunnel, I ponder the realm I leave behind. The walk has taught me important lessons about how I relate to earth. Renewed and revitalized, I pass through the second door to the light and warmth of the day. ■

Of Ditches and Trout

Montana's world-renowned river and stream trout fishing depends on adequate water flows and good habitat to produce self-sustaining populations of wild trout.

A number of laws and programs protect habitat and stream flows, including the Streambed Protection Act (1963), the Water Use Act (1973), the Natural Streambed and Land Preservation Act (1975), the River Restoration Act (1989), and the Water Leasing Study Act (1989). While these programs provide many incentives for maintaining suitable flows for fisheries, the fact remains that agricultural uses of water will always be an important part of Montana's water allocation system. Irrigators have water rights established through legal and administrative processes for production of agricultural crops, and the predominant means by which this water is delivered from the river or stream to the fields is by open canals and ditches.

As a fisheries biologist, I am often asked by anglers, "How many trout are lost down those irrigation ditches?" My pat answer—which happens to be the truth—is, "We don't really know, but we suspect it may be quite a few." Invariably the next question is, "Well, why in the &★$$*## don't you do something about it?"—which, discounting the expletives, is a good question. In this article I'll try to answer these questions and describe a cost-effective water management technique used successfully by irrigators in the upper Big Hole Valley to return fish from irrigation ditches back to the Big Hole River at the end of the irrigating season.

The answer to the first question—"How many trout are lost down those irrigation ditches?"—was answered in the early 1950s by W.D. Clothier, who studied the ditches on the West Gallatin River near Bozeman. He found that fish movement into the ditches was greatest early in the irrigating season, while movement out of the ditches was greatest later in the season. The highest numbers of fish were found in the upper one-quarter to one-half mile of the ditches. Although most of the fish in the ditches were not game fish (they were primarily suckers), an average of 37 trout per 1,000 feet of ditch was found in sections nearest the river. While trout losses in any one canal were not large, Clothier believed the cumulative loss for all irrigation systems fed by the West Gallatin River was substantial.

Now that we know some trout are lost to irrigation systems, you might well ask, "What are we going to do about it?" One seemingly logical approach would be to screen the irrigation ditches so fish cannot enter them. While this practice is common in California and Idaho, it has had little application in Montana. Although ditch screening was begun in Montana as early as the 1890s, it was discontinued in 1897. Maintenance of installed fish screens was abandoned by the Montana Fish and Game Department in 1942, partly because it was prohibitively expensive. But even more important is the fact that during low stream flows there may not be sufficient water in a stream or river channel to support the fish population, and fish may need to enter irrigation ditches to survive. Where adequate instream flows have been legally protected to ensure adequate habitat (space) for the fish population, ditch screening may be valuable. It is also useful where a stream or river supports a migratory fish population, which is the case in many West Coast streams. Since neither of these situations exists for most of Montana's streams and rivers, we need to explore other ways of protecting our wild trout fisheries.

One potential method for reducing the number of fish moving into irrigation ditches was suggested in 1955 by J.C. Spindler, who conducted a study in the West Gallatin River drainage to determine how physical features of irrigation diversions contribute to the number of fish lost. He found that loss of game fish was greatest in canals with high volumes of flow and also in those with intakes on river bends. While biologists cannot regulate the volume of flow into diversion canals, we can suggest that irrigation diversions be located on straight segments of rivers and streams.

Another promising technique for reducing fish loss is the incremental shutdown of irrigation ditches at the end of the season. While this idea is not new, it was rediscovered during recent drought years which began in 1985. In the 1950s, Clothier observed that of all trout moving back to the West Gallatin River in the Low Line Canal, 88% moved in response to three reductions in water volume entering the ditch. Based on that evidence, he wrote a brochure, "Methods of Reducing Fish Losses in Irrigation Diversions!" which was published by the Montana Department of Fish and Game in 1953. This brochure explained ways irrigators could incrementally reduce water volume in their ditches to trigger upstream movement of trout. Clothier believed that if fish were given a cue that the ditch was going dry, they would begin to move back to the river. The brochure also recommended clearing ditches of debris that might be used for cover by trout, and removing pool-type holding water that would be attractive to fish. Clothier reasoned that by removing their preferred habitat from the ditches, trout would be more likely to leave when faced with incremental decreases in water flows.

In 1985, faced with extremely low flows in the Big Hole River, the Department of Fish, Wildlife & Parks sent letters to all irrigators explaining this incremental shutdown technique and asked them to implement it during ditch closure. Many irrigators within the basin were also contacted by phone to further explain the importance of trying the method, and to ask them to observe the response of fish in their ditches so the results could be documented. The people in the upper Big Hole were very responsive, and most of the irrigators who tried the incremental shutdown technique reported far fewer fish trapped in their ditches. Frank Stanchfield, a local rancher and fishing guide who lives on a major ditch near Wise River, obtained permission from the ditch owner, Lowell Mallon, to shut the ditch down in increments. After the water was shut completely off, he reported it was one of the first times in his memory that no fish were stranded in the ditch. This sentiment was echoed

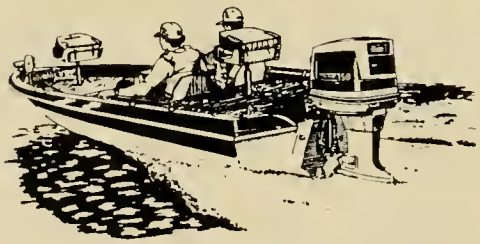
by Fred Hirschy, a rancher near Wisdom, who found no trout in his ditch after trying the new method.

Based on the success of the initial program and the continued drought conditions in southwestern Montana, FW&P began contacting all irrigators in the upper Big Hole on a regular basis asking them to try this type of water management. As more irrigators learned about the technique, especially from neighbors who had used it successfully, they began to adopt it as part of their irrigating practices. Most irrigators find that while it takes a little effort, it is worth doing because they care about the fish.

Trout anglers who are not irrigators should urge and thank their irrigating neighbors for implementing this water management strategy. I'd like to personally thank all the irrigators in the upper Big Hole Valley for their cooperation, and for teaching me a great deal about irrigation and water management. Only by anglers and irrigators working together in Montana can we continue to have quality wild trout fishing and quality agricultural products, since both depend on the clear, clean water with which our state is blessed.

If you would like more information on this technique, contact your local FW&P office or FW&P headquarters at 1420 East Sixth Avenue; Helena, MT 59620. A new brochure, "Methods of Reducing Trout Losses in Irrigation Diversions," is available, free.—*Brad Shepard, fisheries biologist, Livingston*

June 3-9: National Safe Boating Week



With the advent of warmer weather and the prospect of a great summer ahead, water enthusiasts should be gearing up to enjoy Montana's bountiful rivers and lakes. National Safe Boating Week, June 3-9, is intended to inform and encourage boaters, floaters, and fishermen to be properly prepared for their water adventures.

The majority of boating deaths result

continued on page 14

Eight Bite the Dust

AS THE '80s BIT THE DUST, so did eight fish records. Eight Montana records fell in 1989—including one which had stood since 1952—and the rock bass was added to Montana's record list.

The 20-pound rainbow that C.J. Brohaugh caught in Cliff Lake 37 years ago was outclassed by **Jim Aklestad's** 21.45-pound rainbow, taken from a private pond northwest of Vaughn. Aklestad, Great Falls, was using a six-pound test spinning line when he caught the fish on January 30, 1989. He dangled a green-headed jig and a grub under the 14 inches of ice to attract his record-shattering rainbow. It took about 20 minutes to land the fish.

Vance "Bubba" Kielb of Malta not only broke the goldeye record once in 1989—he did so twice, and he did it when he was only 4 years old. On May 9, he caught a 2-pound, 10-ounce goldeye that weighed one ounce more than Lester Estenson's 1977 record. Then on May 15, using a minnow as bait, he caught a 2-pound, 14 1/2-ounce goldeye in an irrigation canal west of Malta.

Vance "Bubba" Kielb with his 2-pound, 10-ounce goldeye.

The blue sucker record also fell twice in 1989. On April 15, Donna Eppers of Great Falls broke Dudley L. Thiel's 1986 record of 7 pounds, 4 ounces with a whopper weighing 10.52 pounds. But on October 7, **Doug Askin** of Miles City topped her fish with an 11.46-pounder. He caught his fish in the Yellowstone River near Miles City.

Moving down the list to burbot (ling), **Jeff E. Iwen** of Wolf Point took a 17.08-pound fish which bettered the 13-pound, 4-ounce record held since 1980 by Paul Keller and Ernie Schutt. Both the old and new record fish were taken from the Missouri River near Wolf Point.

Neil Miller caught his record-breaking chinook (king salmon) in Fort Peck Reservoir on October 7, 1989. His chinook weighed 13 pounds, 4 ounces, almost six pounds more than Joyce Good's 1987 record.

Record golden trout seem to favor Lightning Lake. The record was broken in 1987, 1988, and again in 1989—and all three fish came from the south-central Montana lake. **Tom McGillvray** of Billings broke Jack T. Robertson's 1988 record of 4 pounds, 1 ounce, with a golden weighing 4 pounds, 8 ounces.

Wisconsin fisherman **Ron Skirvin** shattered Mac McKinney's 1977 smallmouth buffalo record of 9 pounds, 4 ounces with a smallmouth weighing exactly one pound more. Skirvin took his fish from the Fort Peck dredge cuts on July 12.

On February 27, **Duane A. Leidholt** of Miles City broke Neil Berg's long-standing walleye record. Berg's 14-pound 1974 record had been tied by Jim Carver in 1983. Leidholt's 1989 record was taken on the Yellowstone River; it weighed 14 ounces more than the previous record fish.

Don Holzheimer's rock bass may not win the heavyweight title, but it did enable him to add another line to the records list. Taken from Tongue River Reservoir on June 1, the Billings resident's record weighed in at 0.57 pounds.

The fact that eight records fell in 1989 should stir the competitive spirit in fishermen who take on Montana's waters to make it nine in '90. What do you do if you think you might have caught a record fish? First, you must catch the fish legally. Second, your fish should be weighed before witnesses on a government-inspected scale such as those found in most grocery stores. Weigh the fish as soon as possible after catching it. Fish can lose precious ounces—ounces that can spell the difference between a record-breaker and an also-ran. Third, the fish must be positively identified, preferably by a Department of Fish, Wildlife & Parks employee. It's also a good idea to take color photographs of the fish to help resolve any identification problems.

As you set out for your 1990 fishing adventures, remember this—EIGHT big ones bit the dust in 1989.—*Kay Morton Ellerhoff, associate editor*

Species	Weight lbs.	Weight ozs.	Angler	Year	Location
Arctic grayling	2	10½	Steve Houser	1986	Hyalite Reservoir
Bigmouth buffalo	32	6	Gary Lundman	1979	Missouri River (Slippery Ann Game Station)
Black bullhead	1	11	Mike Mitchell	1977	Horse Creek (McCone Co.)
Black crappie	3	2	Al Elser	1973	Tongue River Reservoir
Blue sucker*	**11.46**		**Doug Askin**	**1989**	**Yellowstone River (near Miles City)**
Bluegill	2.64		Brent Fladmo	1983	Peterson's Stock Dam
Brook trout	9	1	John R. Cook	1940	Lower Two Medicine Lake
Brown trout	29	0	E.H. "Peck" Bacon	1966	Wade Lake
Bull trout	25	10	James Hyer	1916	unknown
Burbot (ling)*	**17.08**		**Jeff E. Iwen**	**1989**	**Missouri River (near Wolf Point)**
Carp	38	8	Don Bagley	1986	Eyraud Lakes
Channel catfish	25.89		Gordon Wentworth	1984	Fort Peck Reservoir
			Tom Hilderman (tie)	1988	
Chinook (king salmon)*	**13**	**4**	**Neil Miller**	**1989**	**Fort Peck Reservoir**
Cisco	1.28		Larry Garrow	1988	Fort Peck Reservoir
Coho salmon	4	14	Irven Stohl	1973	Fort Peck Reservoir
Cutthroat trout	16	0	William D. Sands	1955	Red Eagle Lake
Freshwater drum	20	7	Richard C. Lee	1987	Fort Peck Reservoir
Golden trout*	**4**	**8**	**Tom McGillvray**	**1989**	**Lightning Lake**
Goldeye*	**2**	**14½**	**Vance "Bubba" Kielb**	**1989**	**Irrigation canal (west of Malta)**
Kokanee (salmon)	5	15	Forrest Johnson	1976	Pishkun Reservoir
Lake trout	42	0	Dave Larson	1979	Flathead Lake (east shore)
Lake whitefish	10	0	Ruby Mutch	1986	Lower St. Mary Lake
Largemouth bass	8	2½	Juanita A. Fanning	1984	Milnor Lake
Longnose sucker	3.27		Ray Quigley	1988	Marias River
Mountain whitefish	5	1½	Mervin "Frog" Fenimore	1987	Kootenai River
Northern pike	37	8	Lance Moyler	1972	Tongue River Reservoir
Northern squawfish	7.25		Loyal Herreid	1987	Lower Flathead River
Paddlefish	142	8	Larry Branstetter	1973	Missouri River
Pallid sturgeon	60	0	Gene Sattler	1979	Yellowstone River
Pumpkinseed	0.95		Tim Colver	1985	Milnor Lake
Pygmy whitefish	0.16		Orlin Iverson	1982	Ashley Lake
Rainbow trout*	**21.45**		**Jim Aklestad**	**1989**	**Private pond (northwest of Vaughn)**
Rainbow-cutthroat hybrid	30	4	Pat Kelly	1982	Ashley Lake
Rock bass**	**0.57**		**Don Holzheimer**	**1989**	**Tongue River Reservoir**
Sauger	7	2	Raymond V. Johnston	1975	Tongue River Reservoir
Shorthead redhorse sucker	4.68		Ray Quigley	1985	Marias River near Loma
Shortnose gar	3	1	John Johnson	1977	Fort Peck dredge cuts
Shovelnose sturgeon	13.72		Sidney L. Storm	1986	Missouri River
Smallmouth bass	5.11		Marvin Loomis	1987	Fort Peck Reservoir
Smallmouth buffalo*	**10**	**4**	**Ron Skirvin**	**1989**	**Fort Peck dredge cuts**
Stonecat	0.42		Robert M. Garwood	1985	Milk River at Havre
Utah chub	1.43		M. Steve Kovatch	1986	Canyon Ferry Reservoir
Walleye*	**14**	**14**	**Duane A. Leidholt**	**1989**	**Yellowstone River (near Miles City)**
White bass	1	2	Ludwig Dubbe	1986	Fort Peck dredge cuts
White crappie	2	2	Drew Jackson	1978	Tongue River Reservoir
White sturgeon	96	0	Herb Stout	1968	Kootenai River
White sucker	5	5⅓	Fred Perry	1983	Nelson Reservoir
Yellow bullhead	0.72		Wade Fredenberg	1987	Yellowstone River
Yellow perch	2.37		Vernon Schmid	1988	Ashley Lake

***New Montana record for 1989**
****New to Montana's record list**

from someone falling overboard or boats capsizing. Most of the victims in these accidents never even expected to get wet, and many were "good swimmers."

Boating accidents and fatalities can be reduced by following these precautions:

- Carry essential safety equipment, and be prepared for foul weather.
- Distribute the load in a boat evenly.
- Don't stand up in a boat.
- Don't make sudden turns or stops.
- Limit alcohol consumption.
- Operate at safe speeds.
- Tell a reliable person your travel plans and expected time of return.
- Make sure a properly sized Coast Guard-approved personal flotation device (P.F.D.) is available and readily accessible for each person on board.

Coast Guard studies have shown that up to 85% of all boating deaths could have been prevented if the victim had been wearing a P.F.D. These real "life savers" protect against drowning and can help protect against hypothermia (exposure to cold water is another major killer in boating accidents).

For more information about boating safety, contact Elizabeth Lodman, boating safety coordinator, Department of Fish, Wildlife & Parks, 1420 East Sixth Avenue; Helena, MT 59620 (406/444-2615).

Look Out for Bighorns

A recently completed bighorn sheep viewing and interpretive site is holding true to its name—at the time the accompanying photo was taken (February), 66 sheep were grazing in the field. The site is eight miles east of Thompson Falls on Montana 200. The Thompson Falls bighorn sheep herd comprises about 300 animals.

The site came about partly because of concern expressed by local highway patrolman Harold Savik that people viewing sheep were posing a traffic hazard. The road was quite narrow and sheep watchers were literally stopping—and sometimes leaving—their vehicles in the middle of the highway. A plan was developed, proposals written, and contacts were made to try to solve this growing problem.

The landowners, Mr. and Mrs. Les Hodges, graciously donated an easement to their property so the site could be extended away from the highway and parking could be provided. Wheelchair access is also available. Funding was provided by a grant from the Rittenour Foundation and from the Thompson Falls Sportsman's Club.

Volunteers constructed most of the site and local artist, Craig Phillips, donated the art for the six interpretive signs (horn development, food habits, valley geology, diseases and parasites, behavior, and history and current management).

Cooperative efforts of individuals, organizations, and state and federal agencies made this sheep-viewing area possible. In addition to those named above, the following also contributed time, money, or materials: Vinson Timber Products, Eastern Sanders County Sportsman's Club, U.S. Forest Service, Montana Department of Fish, Wildlife & Parks, Montana Highway Patrol, Montana Department of Highways, Chamber of Commerce in Thompson Falls and Plains/Paradise, Tom Lemke (previous FW&P biologist in the area), Thompson Falls High School shop class, and Lawyer Nursery.

The area offers an excellent opportunity to observe and photograph adult rams, sub-adult rams, ewes, and lambs at close range. The best time to view bighorn sheep is from November through mid-December and from mid-January through the middle of April. Visitors are asked to respect landowner rights and confine their activities to the sheep-viewing area.—*Bruce Sterling, FW&P area biologist, Thompson Falls*

BRUCE STERLING

A bighorn sheep viewing site has been constructed east of Thompson Falls.

Peterman Heads Fisheries

Larry Peterman, an 18-year veteran of the Montana Department of Fish, Wildlife & Parks, has been named administrator of the agency's Fisheries Division. Peterman, who was the division's research and special projects bureau chief, replaces Patrick Graham who was promoted to FW&P associate director.

TOM WARREN

Larry Peterman

Peterman began his department career as a fisheries biologist in Livingston and Miles City. He also served as the water resources supervisor in Helena where he was responsible for water reservation and rights and coordination of reservoir operations.

"Larry has a broad background in fisheries and has developed a positive working relationship with other agencies, companies, and sporting groups," said FW&P Director K.L. Cool. "This combination of experience and his administrative abilities will go a long way toward keeping Montana's fisheries programs one of the best in the nation."

Peterman completed his undergraduate studies in biology at Wisconsin State University and earned a master's degree in fish and wildlife management from Montana State University.

"With the exception of painting, nothing in this life has held my interest as much as fishing. Fishing with a fly, a bait, a handline; I don't much care. Fishing, in my estimation, is not a hobby, a diversion, a pastime, a sport, an interest, a challenge, or an escape. Like painting, it is a necessary passion."

—Russell Chatham, in his preface to "Dark Waters"

"Evening Fishing"—collection of Tom Morgan, R.L. Winston Rod Company

MUSEUM SHOWCASES CHATHAM ART

From June 9 through October 7, the Museum of the Rockies will present a 30-year retrospective of Russell Chatham's art. Chatham is a Livingston artist, writer, fisherman, and publisher who moved to Montana in the early 1970s. The exhibit will comprise 100 pieces Chatham painted between 1959 and 1989, a 12-canvas series of new work called "The Seasons," and a display by other artists who influenced him.

The new museum, on the campus of Montana State University in Bozeman, is a substantial facility with a state-of-the art planetarium as well as a paleontology department with an international reputation. The museum offers three galleries suitable for displaying art—some 9,000 square feet of exhibit space. The 100 paintings

"Moonrise over the Absarokas."—collection of John and Diane Stillman

"I never really get used to seeing ducks high in the northern Rockies. The first glimpse of them strung out above a jagged rimrock of the Absaroka Range reminds me of the strange gargoyles in the 'Wizard of Oz' that come down from the witch's castle to attack Dorothy and friends. The birds find sanctuary in this harsh landscape down in the river valleys and in spring creeks and ponds."

—Russell Chatham, from "Mountain Mallards," a chapter in "Dark Waters"

Chatham personally selected for the exhibit—from over 1,000 possibilities—will be shown in the exhibition hall.

To enter the exhibition hall, one passes through a large, airy gallery. Here, a huge work, 10 feet by 12 feet, will begin "The Seasons" exhibit. This large center piece depicts the confluence of the Gallatin, Madison, and Jefferson rivers where they become the Missouri. Continuing around the gallery, the viewer will pass from winter into summer, to fall, and back into winter, glimpsing the unfolding of Montana's seasons.

The gallery walls are unevenly divided into a number of panels; Chatham has painted 11 canvases, all five feet high, to occupy this space. The undertaking was a huge one: Two of the paintings are three feet, six inches wide; two are four feet, six inches wide; four are seven feet wide; two are nine feet wide; and one is 14 feet wide.

The museum is raising money to pay Chatham for the large entryway painting; the other 11 will go to the museum as gifts from the artist and will become part of the museum's permanent collection.

The third gallery is a mezzanine above the museum's entrance. This space will showcase works owned by Chatham which he considers of "personal import." Featured will be about 30 paintings by Chatham's grandfather, Gottardo Piazzoni; some examples by his great-uncle, Maurice Del Mue; and a variety of work by friends such as Richard Van Wingerden and Kathe Kollwitz.

Clark City Press, a Livingston publishing operation which Chatham oversees, will publish a substantial catalogue to accompany the exhibit. From Memorial Day through Labor Day, the museum's hours are 9 a.m. to 9 p.m. daily; after Labor Day, the museum is closed Monday, open Tuesday through Saturday from 9 a.m. to 5 p.m., and on Sunday from 12:30 to 5 p.m. Admission is $3 for adults and $2 for children; for additional information about the Chatham retrospective or other museum activities, call 406/994-2251.—*Kay Morton Elterhoff*

"Fall Evening"

"There are windless days in all seasons when the air seems so fragile, so utterly pure, that you remember them with much more immediacy than you do the weeks of blustery torment....

"Balanced there on the end of the natural calendar, like a candle almost burned out, these cherished days are a blend of hope and resignation. Game and waterfowl begin to migrate; there is movement, change, anticipation. There is also the hard reality of the coming winter—a sense of oppression, hibernation, death. Autumn in Montana is a humbling yet exciting time, and when you have fully experienced it, you know exactly why you live here."

—Russell Chatham, Mariah/Outside, *Oct./Nov. 1979*

"September" (Missouri Headwaters Suite)

OLD FISH,
The Changing Face
NEW FISH,
of Flathead Lake
BIG FISH

by Jim Vashro

MY ROD TIP SUDDENLY POPPED UPRIGHT, then bent over in a tight arc as my downrigger release did its job. The fish bulldogged deep for 10 minutes, then yielded to the unrelenting pressure of the rod and slid into my landing net. It was a cream-spotted lake trout weighing about 14 pounds, a little heavier than the three other "Macs" I'd landed that afternoon on Flathead Lake.

As the evening shadows lengthened, I pointed my boat toward West Shore State Park where campfire smoke curled up through the trees. Kids scrambled around on the shore, fishing for westslope cutthroat or bull trout. To the north, sailboats darted about like brightly colored dragonflies. As the setting sun washed the peaks of Glacier National Park and the Swan Range with a rosy hue, reflected in the quiet surface of the lake, I drank in the beauty of the moment. Ironically, the serene image gave no clue either to the profound changes occurring beneath the water's surface or to the controversy and debate that presently swirls around the lake.

Flathead Lake itself had a turbulent beginning. Starting 12,000 years ago, four successive glaciers ground relentlessly down from the north, gouging out a deep, narrow trough. Thousands of feet thick, the ice pushed up terminal moraines or ridges near the present town of Polson. The glaciers then receded, filling the trough with water and eroding sediments into a delta that would become the Flathead Valley. Over the next 10,000 years, the outflow from the vast lake eroded the moraine in a mindless attempt to empty the lake, an effort first slowed by bedrock and then halted, at least temporarily, by construction of Kerr Dam.

As the waters cleared of glacial silts, fish populated the lake and river system. Westslope cutthroat trout and pygmy and mountain whitefish foraged for zooplankton and insects, along with northern squawfish, peamouths, longnose and largescale suckers, redside shiners, and sculpins. Bull trout were the only major predators in the system. All of these species were well adapted to live in the cold, clear, almost sterile waters of the Flathead.

The Salish Indian tribes arrived in the area at least 800 years ago and, impressed by the hospitable climate and other attractions, began to settle around the lake. Unburdened by the prejudices of future angling purists, the Indians relished squawfish and suckers as well as trout and whitefish. This peaceful existence was disturbed only by an occasional raiding party of Blackfeet Indians until the arrival of white explorers, trappers, and missionaries beginning in the early 1800s, and later, settlers. These newcomers soon began to tinker with the lake and its finny inhabitants. To date, their efforts have been dominated by concrete and two unfortunate mistakes.

The concrete came in the form of

DIANE ENSIGN

The calm exterior of Flathead Lake gives no clue to the profound changes occurring beneath the surface. Today, yellow perch account for up to 75% of the fish harvested from the lake. Along with lake trout and whitefish, they have replaced kokanee as the mainstay of the fishery.

dams—three so far.

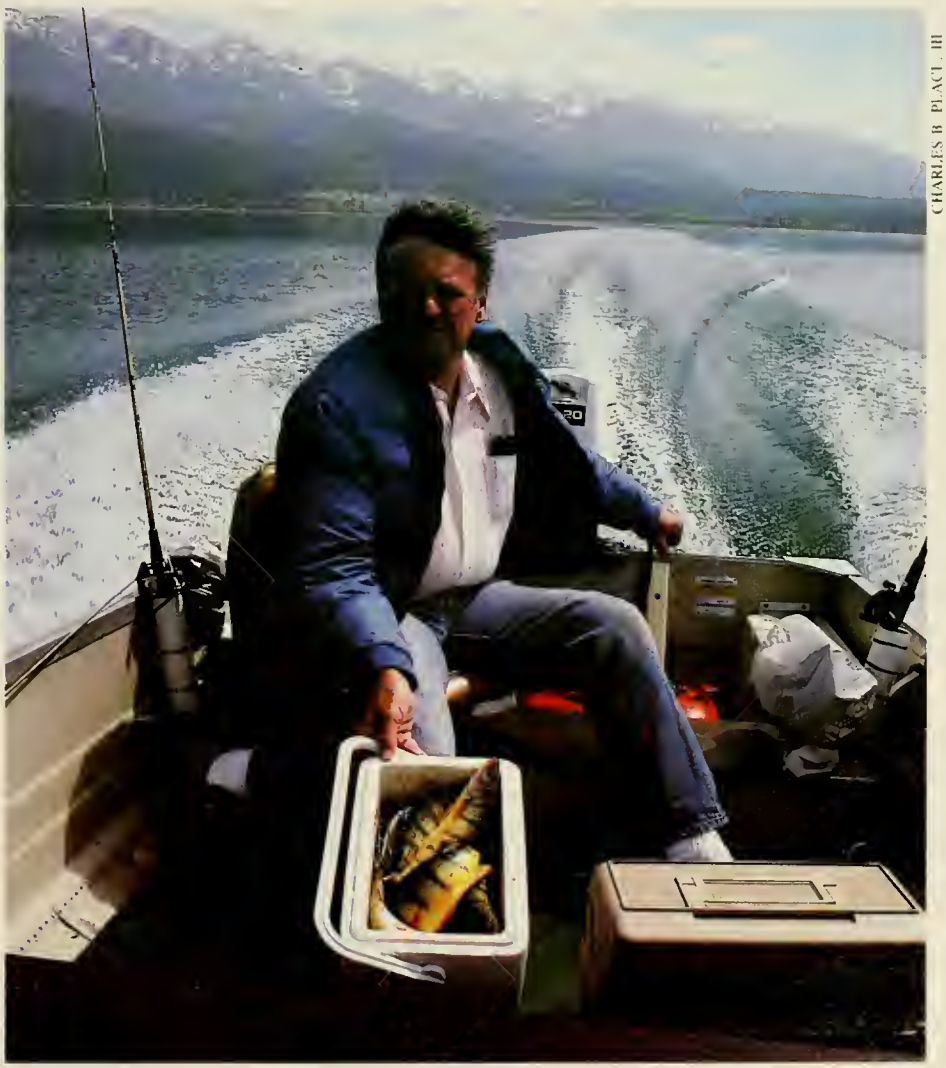
The first was Bigfork Dam, built in 1902 on the Swan River just over a mile upstream from Flathead Lake. Although only 12 feet high, the dam severed access to 18% of the suitable spawning habitat in the Flathead drainage for migratory cutthroat trout, bull trout, and whitefish.

Kerr Dam, at the outlet of Flathead Lake, became operational in 1938. Kerr Dam keeps the lake full through summer and then draws the water down 10 feet in late fall and winter for power generation. The drawdown affects fish that use the shoreline for feeding and spawning, particularly the kokanee that used to spawn in fall along the lakeshore.

The third dam—Hungry Horse—was built in 1953 for flood control and to power a post-war economic boom. But the dam also flooded 77 miles of the South Fork of the Flathead River and its tributaries and cut off more than 40% of the spawning and rearing habitat historically used by Flathead fish. Hungry Horse Reservoir is one of three uppermost storage reservoirs in the Columbia River hydropower system and as such is used heavily to provide flows to downstream reservoirs. Recent drought years have drawn the reservoir down more than 140 feet and have frustrated attempts to improve the fishery.

The mistakes mentioned earlier refer to several of many species introductions that have occurred since the late 1800s. Through the years man has planted largemouth and smallmouth bass; white crappie; pumpkinseed; black bullhead; yellow perch; Lake Superior whitefish; grayling; lake, rainbow, brook, and Yellowstone cutthroat trout; and chinook, coho (silver), and kokanee (sockeye) salmon. Under this Johnny Appleseed approach some fish have flourished, while others have disappeared or exist only as remnant populations.

The kokanee was introduced by mistake in a plant of chinook salmon in 1916; the chinook disappeared, but the kokanee stayed on and by 1930 had evolved into a fishery that would dominate the lake for the next 50 years. Other introduced fish, such as lake trout, lake whitefish, and yellow perch, have also flourished; in fact, a creel census in 1981 showed that introduced species accounted for 98% of the total annual harvest. In the early 1980s, this combination of fish offering both tro-



CHARLES B. PLACE, III

phies and lots of good eating was producing over 100,000 days of fishing each year and a harvest of more than 300,000 fish—enough to make Flathead the second most popular lake in the state (surpassed only by Canyon Ferry Reservoir). Then the second mistake occurred.

In 1981, *Mysis* shrimp were detected in Flathead Lake. The *Mysis*, or opossum shrimp, had been introduced into Whitefish and Swan lakes by the Department of Fish, Wildlife & Parks (FW&P) in an effort to grow larger trout and salmon. Surveys in Kootenay Lakes, British Columbia, showed that kokanee feeding on *Mysis* were growing to four pounds or better. In a tidal wave of enthusiasm, *Mysis* were planted in dozens of lakes around the Pacific Northwest, and anglers and biologists settled back to wait for the big fish to appear. Too late, they found out that the Kootenay Lake experience was a quirk of nature and that in most other lakes *Mysis* not only didn't provide extra food for salmon but actually competed for the same zooplankton that salmon eat.

During the day, *Mysis* live in deep water on the bottom of lakes while salmon are feeding far above. At night, after the salmon quit feeding, *Mysis* begin their long journey to the upper layers of the lake where they dine in peace on the same zooplankton the kokanee need. Approaching daylight sends the *Mysis* back into the depths, safe from the hungry kokanee. *Mysis* are such efficient predators that they deplete zooplankton populations, delaying and depressing their population peaks, often with drastic impacts on fish that rely on zooplankton.

Soon after the *Mysis* from Swan or Whitefish lakes drifted down to Flathead Lake, the kokanee fishery began to collapse (although the *Mysis* were probably only the final nail in the coffin, as will be explained later). The collapse of the kokanee, which provided 90% of the recreational fishery, and the resulting ripple effect through the remaining fish community, touched off a firestorm of debate over the future of fish management in the lake.

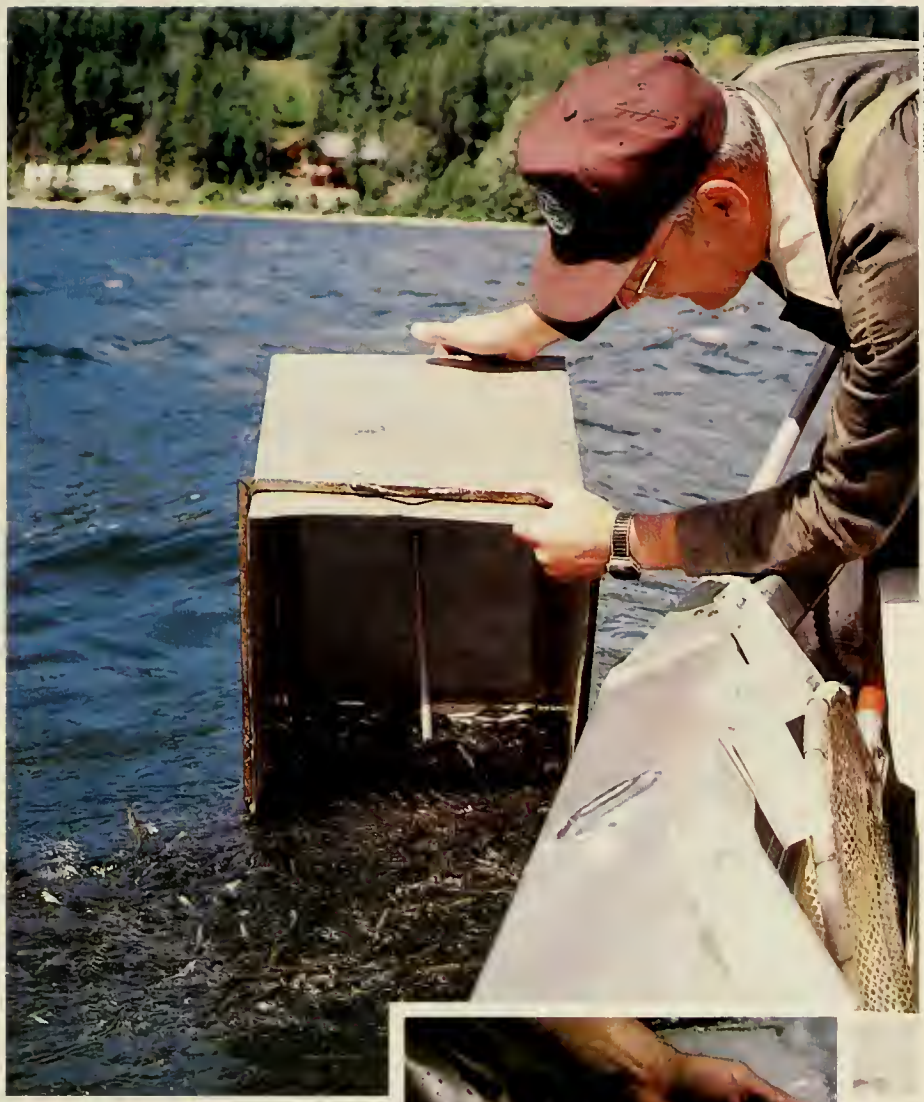
Faced with mounting controversy, the FW&P and the Confederated Salish and Kootenai Tribes (CS&KT) initiated a management plan process in 1988. The tribes were gradually increasing their management authority on the south half of Flathead Lake, which lies within the Flathead Reservation, based on the Hellgate Treaty, court cases, and tribal resource management ordinances. Since fish move freely across the jurisdictional boundary, both sides agreed it was in the best interests of the fishery to develop a joint management plan. The plan would set mutual objectives, establish a strategy for kokanee recovery, protect native fishes, and set the stage for mitigating the impacts of Kerr and Hungry Horse dams. With these objectives in mind, biologists held scoping meetings around the region, prepared a draft plan for public comment, and distilled all the comments into a final "Upper Flathead System Fisheries Management Plant, 1989-1994" that was adopted by the CS&KT Tribal Council and the Montana Fish and Game Commission on August 8, 1989.

The plan set forth a number of steps to be taken in the next five years. Although it occupies a deceptively small portion of the plan, protection and enhancement of aquatic habitat and water quality is the cornerstone of the program. To this end, FW&P and CS&KT will work with conservation districts, Flathead and Lake counties, and the U.S. Army Corps of Engineers to review the more than 200 stream and lakeshore alteration projects proposed each year. Cooperative studies are under way with the Flathead Basin Commission, U.S. Forest Service, Plum Creek Timberlands, Montana Department of State Lands, and other groups to define the relationships between land management, water quality, sediment in streams, and impact of sediment on fish. Reviews of forestry practices, timber sales, mining, and other resource development proposals are also ongoing. Perhaps the biggest job lies yet ahead as FW&P and CS&KT document the fisheries impacts arising from construction and operation of Kerr and Hungry Horse dams and prepare and implement mitigation plans.

During the scoping meetings, almost everyone supported protection of habitat and water quality, but debate soon arose over fish management. Anglers were about evenly divided over restoring the kokanee fishery versus protecting and enhancing native trout, but indicated a strong desire to maintain the trophy lake trout fishery. Based on public comment and the changing conditions in the lake, the management plan set forth a middle-of-the-road approach with modest changes in fishing regulations and experimental hatchery plants to augment kokanee, cutthroat, and bull trout populations. The plants represented a change from the past management objective of establishing wild, self-sustaining fisheries, but biologists felt this was the only way to offset the impacts of the dams and increasing angler demands. Following is a brief summary of the status and management issues for some of the major game fish.

KOKANEE

Kokanee were the cornerstone of the past fishery, providing both a very popular summer fishery and forage for trophy lake and bull trout. Kokanee, however, began decreasing in abundance in the mid-1960s. It appears that changes in operation of Kerr Dam and later Hungry Horse Dam reduced lakeshore and river spawning success, respectively, as kokanee laid their eggs in shallow areas that were later dewatered during changes in power production. Fishermen also began to have an impact as summer trolling, ice fishing in Skidoo and Blue bays, and snagging grew in popularity and efficiency. The FW&P and CS&KT responded by reducing the daily limit from 35 to 20 and finally to 10 kokanee, and successively closing the snagging and winter fisheries, but it was too little, too late. Also, large trout had always eaten a hefty portion of the kokanee; as the salmon population shrank, predation took a proportionately larger share. Although 12 to 20 million kokanee fry were being produced naturally each year, only 80,000 to 120,000, or roughly 1%, were surviving to adulthood and spawning after the accumulated impacts had taken their toll. It would take very little to wipe out that meager return, and the last straw was *Mysis*. The mechanism isn't



MIKE ADERHOLD

MIKE ADERHOLD

In an attempt to restore the ailing kokanee fishery, 3 million to 5 million young salmon are being stocked each year. The average kokanee in Flathead Lake (right) matures at 3 1/2 years of age and 12 to 14 inches in length.

fully understood and may involve an interaction with lake trout predation, but soon after *Mysis* appeared, the salmon spawning runs dwindled to a few hundred fish. The summer fishery collapsed, sending shock waves through the tourism-based economy and raising fears that trophy lake trout, which depended on kokanee for up to 70% of their diet, would also fade away.

Because some salmon fisheries (lakes Pend Oreille and Tahoe) have recovered with hatchery plants, FW&P proposed an experimental program involving the stocking of 3 million to 5 million salmon each year. These fish are being raised to about two inches in length and planted over a wide area in the lake to reduce predation and *Mysis* competition. Net pens are being used to acclimate the fish to the lake and also serve as an economical means of expanding hatchery space.

The 3 million to 5 million planting goal was based on existing egg supplies and hatchery space, but it immediately came under fire from opposing groups. One group, led by Trout Unlimited, branded kokanee an interloper that competes with native fish. They claimed the plants were too expensive, that the majority of recovery plants in other places had failed, and that the program should be dropped in favor of native trout. The other side, led by the newly formed Flathead Fishing Association, called for recovery of the popular kokanee fishery through construction of a new hatchery and plants of 15 million salmon. Although conceding that 15 million salmon might be needed to fully test the system, FW&P officials could only commit to planting all available kokanee (about 4 million) for four years to test recovery.

WESTSLOPE CUTTHROAT TROUT

The Flathead contains one of the strongest existing populations of westslope cutthroat trout, a fish now designated as a species of special concern because of declines in abundance and distribution. Westslope cutthroat can provide a lot of fishing in spring and fall, although they are generally deep and unavailable to anglers during the more popular summer season. The management plan calls for planting 1 million four- to six-inch fish annually to replace fish lost to dam construction. Trout Unlimited and others have criticized this action on the basis that hatchery plants will jeopardize the genetic integrity of wild fish, and have instead called for restricted harvest through catch and release to build the population. But the harvest is already small, about 30,000 fish annually, and catch and release would not satisfy anglers used to harvesting salmon. Even so, the lake limit has been dropped from five to two until the population can be increased. Also, the westslope cutthroat trout broodstock has been completely revamped in recent years under the direction of the University of Montana Genetics Department. The majority of brood fish come from the Flathead and geneticists contend that hatchery fish will have little impact on genetic integrity of wild fish.

BULL TROUT

Bull trout grow to over 20 pounds and embark on spawning migrations up to 140 miles that attract trophy fishermen. Because they are vulnerable to habitat degradation, overfishing, and poaching,

bull trout are now listed as a species of special concern. Anglers catch about 5,000 bulls each year, but another 3,000 adults survive to spawn. The population appears stable, although sediments accumulating in spawning gravels due to land management activities have the potential to hamper reproduction. The daily limit has been reduced to one fish, and most spawning streams have been closed to fishing to help hold the line. The management plan calls for experimental plants of 260,000 eight-inch bull trout annually to increase angling opportunity. Critics call the plants an expensive experiment that will alter bull trout genetics, but biologists see no other alternative, other than a ban on fishing, that would appreciably increase the population.

LAKE TROUT

The lake trout or Mackinaw fishery has national stature, with fish averaging 30 inches and weighing more than 12 pounds, and occasionally exceeding 20 and even 30 pounds. Unlike other fish species in Flathead, however, lake trout have been increasing—perhaps too much for their own good, since some trophy fisheries have boomed into stunted populations. *Mysis* have been a paradox, increasing the food supply for small lake trout while decreasing the food supply (kokanee) for larger ones. Fisheries managers hope that lake trout will learn to eat other abundant prey such as perch and whitefish, but in the meantime FW&P and CS&KT have increased the limit to seven lake trout daily with only one over 26 inches. This should encourage the harvest of smaller lake trout and help keep the population in balance, while at the same time protecting the larger trophy fish (lake trout take 10 years to grow 28 inches in Flathead Lake).

Some commercial outfitters and trophy fishermen feel this plan is too conservative; they would like to see more restrictive regulations and introduction of a new forage fish to keep lake trout size from declining. Others caution that adding a forage species now could aggravate the ongoing changes in the fishery. Some anglers contend that trophy trout require expensive and sophisticated boats and equipment, and that the large fish are oily and unpalatable. On the other hand, many anglers are delighted with the smaller fish now appearing. These three to six-pounders are catchable from shore or near shore, and their heavy diet of *Mysis* gives them tasty orange flesh.

YELLOW PERCH

No one pays much attention to yellow perch, but a lot of anglers must fish for them. In fact, the lowly perch now accounts for up to 75% (50,000 fish) of the harvest from Flathead Lake. Their excellent flavor makes them a good alternative for anglers who want to harvest a lot of fish. Studies by CS&KT indicate perch populations are healthy and may be growing. Perch are also becoming an important food item for shoreline feeders such as bull trout, small lake trout, and lake whitefish.

LAKE SUPERIOR WHITEFISH

Lake Superior whitefish are definitely the most overlooked game fish in the lake. They may also be one of the key species in determining future management. Originally introduced to provide a commercial fishery (which never developed), they increased slowly and steadily—until recently, when numbers jumped dramatically, possibly in response to *Mysis* or to lack of competition from kokanee. They now make up 80% of the fish in the lake and are major competitors for food and space. Predation on young kokanee and perch by lake whitefish also appears more extensive than previously thought.

Lake whitefish numbers will probably have to be reduced to successfully introduce more fish or new fish to Flathead Lake. Bull trout appear to be the only major predator of lake whitefish at present, although biologists hope lake trout will learn to feed on whitefish and so maintain their trophy size. Although anglers tend to scorn whitefish, lake whitefish are better tasting than their river-run cousins and have the added advantage of being great fighters and easy to catch. As such, they are an ideal substitute for former kokanee fishermen.

The Flathead fishery is currently in a tremendous state of change, as the food chain shifts from a mid-water, free-ranging population of kokanee and zooplankton to one dominated by bottom-dwelling *Mysis*, lake trout, and lake whitefish. Managing the fisheries at this point is like trying to hit a moving target. There have been many requests to introduce new fish, such as a forage fish or another trophy fish (e.g., Kamloops rainbow, chinook or coho salmon). Indeed, introduced fish have been successful and have produced a tremendous amount of recreation over the years. But the current situation with *Mysis* dictates more caution in the future, and new introductions will only be approached through careful environmental analysis and public involvement.

The management picture is further confused by the complex and sometimes conflicting jurisdictions in the Flathead. The Flathead system originates in a foreign country (Canada), flows past Glacier National Park, through wilderness, national forests, public and private lands, the sovereign nation of the Flathead Reservation, and into the state of Idaho. Each entity has its own interests and needs. But as Ric Smith, angler and sometime journalist from Polson, points out, "Flathead Lake can't be all things to all people." Should we manage the system for wild, native fish, and let it find its own equilibrium? Or should we go for broke with massive fish plants and habitat manipulation to maximize the fishery? Each option has its positive and negative aspects. FW&P and CS&KT feel the present management plan combines the best of both sides by protecting habitat and wild fish while using hatchery fish to fill in the gaps. The management process, which is guided by citizen and technical steering groups, will be an adaptive one that will allow us to learn from our successes and failures.

Old fish, new fish, big fish, lots of fish—anglers' demands sound like a Dr. Seuss nursery rhyme. Will the management plan be a fairy tale where everyone lives happily ever after? Or will *Mysis* be the Grinch that stole Christmas? And will man or nature write the final chapter for the Flathead fishery?■

READERS RESPOND

A Truly Incredible Wildlife Heritage

Several recent issues of *Montana Outdoors* have contained articles on a variety of watchable wildlife species or groups. I commend you for featuring some fine pieces, such as the articles on owls, bald eagles, and marmots.

I think such articles reflect highly on the Department of Fish, Wildlife & Parks' commitment to all the state's wildlife—not just those considered huntable species. I appreciate and support your efforts to educate and inform the public on the truly incredible wildlife heritage that is our privilege to enjoy and responsibility to sustain.

Thanks to all the authors who contributed their articles, and thanks to *MO* for bringing them to the public in an attractive format.—*George Wuerthner, Livingston*

Wolf Re-Introduction Is a Necessity

After reading your Nov./Dec. 1989 issue, I felt it necessary to comment. As a professional biologist, I was quite impressed with your understanding of the present population dynamics of the elk herds in Wyoming and Montana.

But in several cases, you seem to attribute the winterkill problem solely to lack of adequate wintering areas and natural forage, and to Yellowstone's winter feeding program. Not once did you recognize the fact that lack of the elk's natural predators (wolf, cougar, and grizzly, to some extent) is one of the main reasons for the population explosions of the elk, deer, and bison herds in recent years. That fact is as important—if not more significant—than the other factors mentioned.

Wolves would have exactly the same effect on lowering the herd numbers as starvation. They would remove the old, the young, the sick, and the feeble, thereby strengthening the herds. They, too, would achieve the result of leaving only the most prime and most fit individuals to breed. Wolf reintroduction into the Greater Yellowstone/Montana ecosystem is a necessity to restore the natural balance of the big game animals there. Wolves could also be selected to regulate bison numbers. Please recognize that fact, and support it in future issues. Everyone would benefit—elk, conservationists, and hunters.—*Terry Beaver; Cohoctah, Michigan*

* * * * *

• *It is generally believed by biologists that the abundance of prey determines the number of predators that can be sustained, not the reverse. In Yellowstone, only time will tell whether or not this principle applies. Montana offered to manage the recovery of wolves in the state in 1987, and that offer included agreeing to the restoration of wolves in Yellowstone. The federal government declined to respond to that offer.*—Ed.

Rivers Inspire Poetry

I really enjoyed your article on the Musselshell River in the Sept./Oct. 1989 issue. I am a canoeist and have run several rivers in Washington, British Columbia, the Northwest Territories, and Alaska.

When I have extra time, I like writing poems about these rivers and the experiences I've had. Enclosed please find a poem I wrote before reading the Musselshell article.—*Bob Younkins; Bellingham, Washington*

The Life of a River

The life of a river,
is only one year.
In the fall, they're quiet & listening,
For that's when they hear.

A river in the winter,
A long frozen vigil it keeps.
It lies dormant & resting,
For that's how it sleeps.

Then at spring break-up,
The whole mountain rings.
It babbles and bubbles,
For that's how it sings.

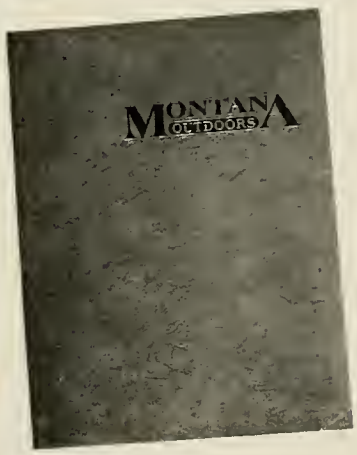
Then it races down the mountain,
So happy to be free.
It leaps over boulders,
For that's how they see.

Each side stream is welcomed,
Like an old friend they know.
They come from all directions,
For that's how they grow.

Then when it clears,
Fish & beaver come to stay.
It swishes & swirls,
For that's how they play.

There's shining white rapids,
For miles & miles.
The river is happy & joyous,
For that's how it smiles.

Then it forms a delta,
and that's how it cries.
Then the river meets the ocean,
And that's how it dies.



Clutter Got You Behind the Old Eight Ball???

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Developments at Dancing Prairie
continued from page 6

diverse sources to keep track of sensitive species and land management issues affecting native plants and animals.

Late in 1987, The Nature Conservancy purchased a 280-acre parcel adjacent to the sole surviving lek to protect the rare plant. This area is now called the Dancing Prairie Preserve. The Nature Conservancy is negotiating for an additional 400 acres that include the surviving lek. The second lek, last active in 1980, had been overgrazed and abandoned.

In spring of 1987, The Nature Conservancy and the Montana Natural Heritage Program, with approval of FW&P, initiated efforts to augment the last remaining lek with wild Columbian sharptails trapped in British Columbia. The goal was to maintain the last known active displaying ground. Other grouse studies have shown that reintroductions are more successful when resident birds are present. Fourteen males, captured on a lek near Kamloops, B.C., were released in the spring of 1987. Surveys during the winter and spring of 1987-88 revealed that survival of the released birds was good and that they had returned to the lek.

An additional 13 males were released on this lek in the spring of 1988 and, in March of 1989, researchers saw 10 males there. One of the birds was from the 1987 release and nine were from the 1988 release. Improvement in trapping methods resulted in capture and release of nine females and four more males during the spring of 1989. By the end of April of 1989, the total number of Columbian sharptails on the lek was 24, but researchers saw only one female sharptail not part of the release efforts.

IN FALL OF 1988, the Bonneville Power Administration awarded FW&P a contract to develop a protection plan for Columbian sharptails and several other species affected by the Libby Dam Project. Marilyn Wood, the FW&P biologist responsible for the Tobacco Plains sharptail program, hired Tim Manley. He was asked to look closely at all the information about the Columbian sharptails near Eureka, to document the on-the-ground situation, and to weigh the feasibility of a permanent sharptail recovery at Dancing Prairie.

Manley is a journeyman biologist with a particular talent for this kind of research. He is good at chasing down historical information, and he is an experienced and innovative field technician. (To learn more about his innovative field skills, turn to "Census by Camera" on page 27 of this issue.) In 1986, he worked on a similar project involving woodland caribou.

Manley's 26-page report is still in draft form. He examined a 29-square-mile area (31,360 acres) that comprised all of the Tobacco Plains. Eighty-seven percent of this area is privately owned, 9% is state-owned, and 4% is administered by federal and county organizations. Using aerial photos from 1947, 1966, and 1987, Manley quantified the habitat changes over 40 years. Agricultural land had increased 62%, land developed for residential purposes had increased 41%, and grasslands had decreased 18%.

Comparing the grassland situation near Kamloops, B.C., where Columbian sharptails are still relatively common, with the Tobacco Plains, Manley found the Canada grasslands were more lightly used by livestock and had more grass cover at the end of the grazing season. The winter shrubs used by sharptails in Canada were closer to the leks. Manley speculated that loss of dense cover adjacent to the dancing grounds was an important factor in the abandonment of the Eureka leks. Loss of cover makes the birds more vulnerable to predation and probably affects nesting success. With mortality greater than recruitment a population declines and ultimately disappears.

Manley also found that soil moisture in the Tobacco Plains area was below the 25-year average every year during the 1970s. In other areas, soil moisture has been correlated with breeding success in grouse, and dry conditions during the 1970s could have been an additional factor responsible for the declining population.

During the winter, sharp-tailed grouse move into the shrubs and small patches of deciduous forests to feed and look for cover. These sites must be dense enough to allow the birds to escape from raptors (particularly goshawks) and ground predators (especially coyotes). Manley found that the Dancing Prairie winter habitat seemed a limiting factor. Only 2.6% of the Tobacco Plains has the rose, snowberry, serviceberry, chokecherry, hawthorn, black cottonwood, and birch trees which normally support wintering Columbian sharptails. Much of what was present 50 years ago was flooded when Libby Dam created Libby Reservoir (Lake Koocanusa).

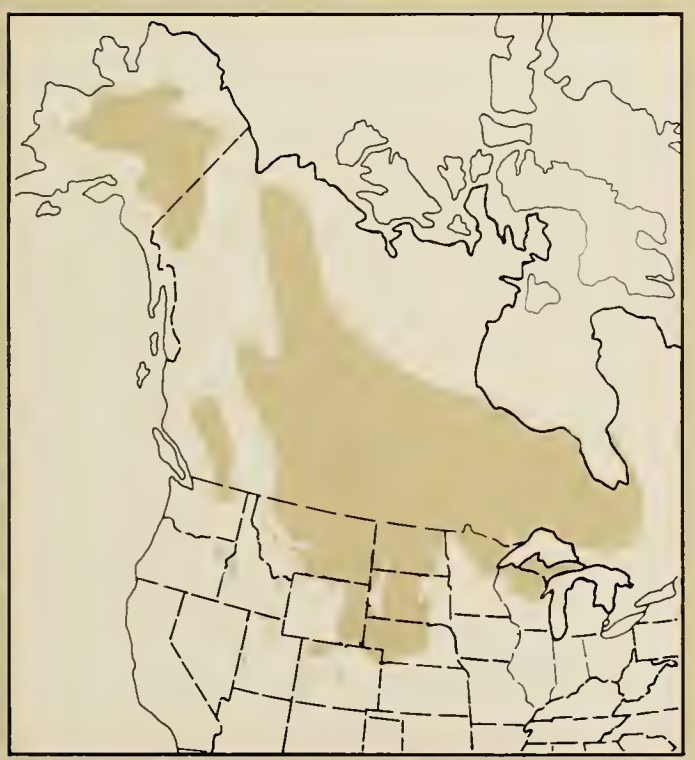
Nobody knows where Columbian sharptails nest in the Tobacco Plains. In areas where sharptails are common, they usually nest within one mile of the lek. At Dancing Prairie, that area was checked several times—without benefit of radio equipment and without success.

Manley pointed out that the Tobacco Plains now are an ecological island, and chances are poor that Columbian sharptails from Canada would naturally repopulate the area. On the other hand, grouse artificially relocated into the area are likely to stay because there are no other prairie areas nearby.

Manley concluded that with proper management in key locations, it might be possible to maintain a viable population. He recommended continuation of grouse relocations and also suggested radio tagging the next females released to determine nesting and brood-rearing areas. Further fencing and planting of winter shrubs and trees would also help. The landowners in the area have been very cooperative and Manley urged that they continue to be informed of the project's progress.

MANLEY'S FINDINGS HAVE BEEN TURNED OVER to a Columbian Sharp-Tailed Grouse Technical Committee composed of representatives from the Kootenai National Forest, The Nature Conservancy, the USFWS,

☐ Past and ☐ present distribution of Columbian sharp-tailed grouse (modified from Miller and Graul 1980).



☐ Current distribution of sharp-tailed grouse in North America.

Montana State University, the Confederated Salish and Kootenai Tribes, and FW&P.

In order, this committee's recommendations are:

1. Protect existing critical habitat in the Tobacco Plains (known lek and winter habitat) and develop management strategies to enhance potential habitat (degraded stream corridors and overgrazed grasslands).
2. Identify nesting and brood-rearing habitat for grouse in the Tobacco Plains so that it, too, might be protected.
3. Determine the feasibility of reintroducing grouse on the National Bison Range. It has a good stand of native vegetation and would add to the chances of recovering the Columbian sharptail in western Montana.
4. Assess the status of the Ovando-Helmville-Drummond area for leks. Columbian sharptails with young have been seen in this area the last two summers.
5. Develop cooperative agreements with the Confederated Salish and Kootenai Tribes for Columbian sharptail management on tribal lands. The Flathead Indian Reservation has one of the best mountain grouse situations in western Montana and still has some good palouse prairie grasslands.
6. Support USFWS efforts to conduct genetic testing to determine subspecies differences. Very little work has been done to define the differences between the various sharptail subspecies. Biologists who have worked with both the plains and the Columbian race believe the latter is smaller, darker colored, and does more jumping in its display and more perching on shrubs near the lek.

SOME QUESTIONS HAVE BEEN RAISED ABOUT THE WISDOM of investing time and money in a small relic population of birds with limited potential for growth and expansion. Risk is involved—the average life span of a sharp-tailed grouse is less than three years and even in unhunted populations, there is about a 40% annual turnover. On the other hand, some sharptail populations have done well over time in relatively small areas.

The support system for Columbian sharptails—palouse prairie country—is probably the support system for other native species. There are other relic bunch grass stands in western Montana, and with this experiment researchers may be able to learn how to restore the native prairie fauna in other areas above Flathead Lake, on the Bison Range, on the Flathead Indian Reservation, on Wild Horse Island, in the Garnet Range, and elsewhere.

There is no question that the Libby Dam Project affected the Columbian sharptail population inhabiting the Tobacco Plains. The initial work with these birds is well within the spirit and letter of the Northwest Power Planning Act. So far, the initial expense amounts to just a few pennies per electric rate payer. Within two or three years, we should be able to tell if the benefits justify the cost. Not to do anything further with the Tobacco Plains sharptail at this point would settle the issue: The birds would probably disappear. By working with them now, we retain our options.■

CONTRIBUTORS

• There's only one well-documented population of Columbian sharp-tailed grouse in Montana, and they hang out near Eureka in an area called the Tobacco Plains. They are a relic population, and their future is far from secure. But some positive things are happening: The Nature Conservancy purchased a parcel of land adjacent to the sharptails' sole surviving dancing ground, and named it the Dancing Prairie Preserve; the preserve also sustains *Silene spaldingii*, a rare plant. The sharptail population was augmented with wild Columbian sharptails from British Columbia, and a healthy percentage of them survived—and returned to the lek (dancing ground). Under a contract awarded to the Department of Fish, Wildlife & Parks by the Bonneville Power Administration, a protection plan is being developed for Columbian sharptails and other species affected by the Libby Dam Project. As **Mike Aderhold** writes, "Not to do anything further with the Tobacco Plains sharptail at this point would settle the issue: The birds would probably disappear. By working with them now, we retain our options." Turn to "Developments at Dancing Prairie" on page 2. Aderhold continues as the department's information officer in Kalispell.

• If you've been there, you know. The Lewis and Clark Caverns are captivating, mysterious, a little frightening, spellbinding, awe-inspiring. For more adjectives, join **Leslie Rickey DeVos** for "Musings of a Tour Guide." She has spent hundreds of hours guiding visitors and friends through the alluring rooms that make up the caverns and, beginning on page 7, she shares some of her observations and feelings about the place. She tells of a college choir she guided through the caverns. When the group reached the Cathedral Room, they asked if they could sing: "As their voices filled the space, it seemed as if we had been transported to some other time and place." DeVos is a teacher in Winnett; she also operates Bison Creek Art Works.

• In a nutshell, Flathead Lake has "Old Fish, New Fish, Big Fish." Turn to page 18 and **Jim Vashro's** exploration of "The Changing Face of Flathead Lake." It's not a simple situation. For a start, the Flathead system has three dams: Bigfork, Kerr, and Hungry Horse. Hungry Horse Reservoir, in particular, has been severely affected by recent drought years; it has been drawn down more than 140 feet at times, thus frustrating attempts to improve the fishery in the lake. The kokance fishery has collapsed, with an opossum shrimp called *Mysis* as one of the chief culprits. In addition, as Vashro writes, "The management picture is...confused by the complex and sometimes conflicting jurisdictions in the Flathead. The Flathead system originates in a foreign country (Canada), flows past Glacier National Park, through wilderness, national forests, public and private lands, the sovereign nation of the Flathead Reservation, and into the state of Idaho." Vashro is the regional fisheries manager in Kalispell. He enjoys fishing Flathead Lake—from the "humble perch to trophy Macs." For assistance with this article, he wishes to acknowledge Ginger Thomas and Joe DosSantos, biologists with the Confederated Salish and Kootenai Tribes, and Laney Hanzel, John Fraley, and Scott Rumsey, FW&P biologists.

• When Rick Mace and his crew finally got Tim Manley's Rube Goldberg heat-sensitive camera stations up and running in the country around the South Fork of the Flathead River, they began writing the book on "Census by Camera." What they got on film was "More Than Just Another Pretty Face." They got grizzly bears (which was the main idea behind the project). An impressive number of them, by standards of researchers who have learned the hard way what an elusive mark the griz is. They have also recorded visits by 17 mammals, a blue grouse, and a moth. Turn to page 27 and another engaging piece by **Tom Palmer**. Palmer is an information officer with the department's Conservation Education Division in Helena.

• The red-necked grebe hasn't received much attention from the scientific community. Much of what the scientists know about it comes from knowledge of grebes in general and from studies in northern Europe. In Montana, the largest breeding group of rednecks is on Georgetown Lake between Anaconda and Philipsburg. Author **Dennis Flath's** surveys on Georgetown, conducted in 1987 and 1989, revealed a population of red-necked grebes much larger than anticipated. To learn more about the "Red-Necked Mystery Bird," turn to Flath's article on page 30. Flath is the department's nongame coordinator.

• Its formal name is the Upland Game Bird Habitat Enhancement Program. It was launched in January—and what it means is that game bird habitat established this year and in ensuing years should provide a solid base for increased populations of game birds in the future. It came about "in response to requests from sportsmen and landowners who recognized suitable habitat as the key to maintaining and increasing Montana's upland game bird populations," writes **Bob Martinka**. The program will emphasize establishing areas of winter cover by planting trees and shrubs where no such cover now exists; establishing, maintaining, or improving permanent grassland areas; establishing dependable sources of winter food; and much more. "Look to the Future" by turning to page 33. Martinka recently moved to Bozeman and his new job as that region's supervisor. Before his promotion, he was chief of the Upland Game Bird Bureau in Helena.

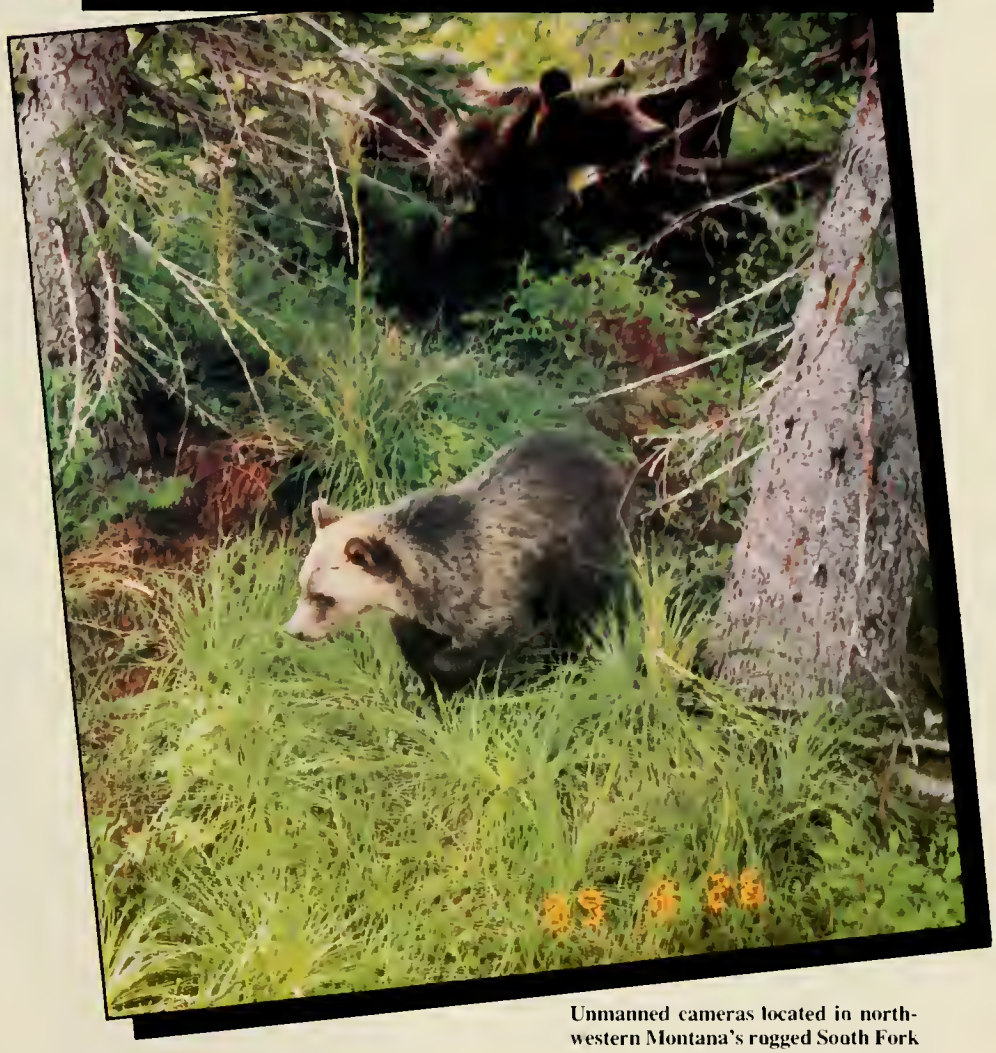
• **Marion Gebhart** has written all of her life, and she sent *Montana Outdoors* her poem, "High Plains," on an impulse. As this issue's Perspectives, it creates a word picture of "Land measured not in acres but in miles." Turn to page 36 and let her words bring additional meaning to the photographs. She lives in Florence—and we're delighted she followed her impulse.

• *MO* thanks the following photographers for their contributions to this issue: **Diane Ensign**, Whitefish; **Michael** and **Patsy Fribley**, Big Timber; **Mike Logan** and **Garry Wunderwald**, Helena; **Alan Nelson**, Great Falls; **Charles B. Place, III**, Lolo; **Barbara Thomas** and **Jan L. Wassink**, Kalispell; and **Mike Aderhold**, Kalispell, who works for the department.■

CENSUS BY CAMERA

More Than Just Another Pretty Face

by Tom Palmer



Unmanned cameras located in northwestern Montana's rugged South Fork of the Flathead River drainage are providing researchers with a new tool for inventorying grizzly bears. Triggered by infrared heat sensors, the cameras are located near baited scent stations.

IT IS THE LAST DAY OF FEBRUARY, but the arching white sun and cobalt sky have conjured a balmy spring tease that just kicked the pants off Montana's winter.

Rick Mace, back from the warm surf and soft kiss of *El Nino* winds off the Santa Barbara coast, expected more than just a nice day. He sits down at his desk at FW&P's Kalispell headquarters and gazes out the window at the Swan Range. It is clear enough to see the assault of the snow-swirling winds on the Swan's 9,000-foot peaks. It is clear enough to see the endless icy skiff of frost clinging to the distant mountain conifers. It is clear enough to see that it is still winter, pants or no. "There is nothing GREEN!" Mace laments.

By now Mace knows waiting for a February green-up in Montana is as fruitless as Vladimir's and Estragon's waiting for Godot. It will come, it will come, if he waits it will come. But just back from vacation, Mace is anxious to get to the South Fork grizzly bears he's been studying since 1988.

"I can see where bears are denning right now," Mace says with a forlorn lilt, still gazing out the window. "I can't actually see the dens, but I know right where they are and I just look out there and ask myself how can I get at those bears. I do it all the time. It's all I think about and I always want to be up there."

It's no wonder. FW&P's two-year-old, federally funded South Fork of the Flathead River Grizzly Bear Project is shaping up to be a most unusual investigation of a species that has acquired a reputation among scientists as a notoriously elusive mark. The goal of the project is worthy of a "Mission Impossible" script: Come up with a solid, repeatable, and Swiss-watch accurate system of counting grizzly bears in the South Fork's densely forested and mountainous terrain.

BORDERED ON THE WEST BY THE SWAN MOUNTAIN DIVIDE, on the east by Hungry Horse Reservoir, on the north by Hungry Horse Dam, and on the south by the Bob Marshall Wilderness, the peninsular, finger-shaped study area is some of the most remote and ruggedly beautiful country in Montana. It is wild and coarse and because there is nothing gentle in its character, you can sense that it is under the reign of the great bear. But it is a place so rugged, so remote, and so inaccessible that one might find it easier to count the forest's galaxy of pine needles than to come up with a plausible estimate of the grizzly bear population.

"We're here to test methods, to build the tools needed to manage this critter," says Mace, leader of the 10-year project. "The grizzly bear, because there are so few of them, is nearly impossible to count, and counting bears is a very important part of this project."

By 1998, the hope is that results of the South Fork Project will provide wildlife managers with practical methods to determine: (1) the size of a grizzly bear population, (2) factors that may limit the

size of a population, and (3) how a population responds to changes in habitat.

Even though some grizzly bear experts have suggested that the effort might be better applied to an area where grizzlies are losing habitat to commercial and residential development, researchers Mace, Keith Aune (who was the project leader until his recent promotion to supervisor of the department's Research Laboratory), and Tim Manley have remained undaunted. They have not only attempted to refine traditional capturing procedures—where bears are caught in snares, immobilized, tagged, and then equipped with radio collars that allow telemetric and satellite tracking—but they are also inventing new grizzly bear counting techniques.

In two years, 22 bears have been captured, and often recaptured, in one of the 61 snares within the imaginary grid the scientists have lain over the 321-square-mile study area. Four of the 22 radio-collared bears—although a glitch in the system sometimes made it difficult to determine exactly which ones—were clearly tracked by satellite. By grizzly bear research standards, the numbers are impressive and probably a reflection of the research team's 70 years of combined experience in studying, capturing, and handling grizzly bears. But the "capture" technique generating the most interoffice high-fives is an oddball Rube Goldberg contraption somewhat akin to an electronic Peeping Tom.

Black bears, mountain lions, and grizzly bears are just three of the 17 species of mammals photographed by the remote photo stations. Others include deer, elk, moose, wolverine, bobcat, and fisher.

DESPITE THE MOUNTAIN MAN ROMANCE associated with capturing, immobilizing, and tagging grizzly bears, most researchers will tell you they experience more than just a twinge of guilt when they are face to face with the bear about to be subjected to such indignities. To document grizzly bear activity, researchers attempting to devise less traumatic sampling techniques have tried to lure grizzly bears to areas they call "scent stations" by hanging carrion from trees and affixing stiff hair brushes to tree trunks to snag fur from the hides of the most ambitious animals, thus proving that a grizzly has visited the site. Others have experimented with 8mm cameras placed in similar

scent stations, but results have been inexact and generally disappointing.

In 1988, South Fork researchers took the best ideas from time-honored scent stations and tried to improve upon the often problematic use of cameras in the random sampling of wildlife. By 1989 they had come up with a crude system invented by photography buff Tim Manley that consists of a compact 35mm Olympus Infinity camera, an infrared heat sensor from a burglar alarm system, and a 12-volt car battery. Once everything is tucked into a weatherproof Army surplus ammunition box, the clunky gizmos are perched several feet away from a scent station. When the bears show up, "CLICK!" The infrared sensors detect body heat and the camera fires away.

At a cost of $430 per box and up to $13,000 for the labor and helicopters it takes to place and use 40 cameras for two weeks, the invention is proving to be an amazingly accurate if expensive census taker that is even more unobtrusive to bears than stadium turnstiles are to baseball fans.

"The photography has allowed us to sample in an unbiased fashion on a systematic grid," Mace says. "With this thing, we can go anywhere in the study area. We can use this four or five times a year without capturing a single bear and that's what it takes for grizzlies. With this photography method, we're getting more grizzlies on film than we're capturing in snares."

Before the project began, the researchers took a hard look at the study area and estimated that 10 to 15 grizzlies were living there. By the end of 1989, thanks to information obtained from physical captures and the unique photo sessions, Mace says they have positively identified 31 grizzly bears. Seven of those bears—including at least two and possibly three family units (females with cubs)—would never have been detected were it not for the camera boxes. "There are more bears in there than anyone thought," Mace says.

MORE IMPORTANT, PERHAPS, IS THE FACT that the photo sample is a mirror reflection of the grizzly population. Before photo sampling begins, researchers fly over the study area and plot the telemetric data transmitted from the radio-collared bears. That way they know the sex and age of the individual bears that might be captured on film. The results obtained from the camera system have shown the same population structure as detected during the telemetric inventory. Eventually, since the photos are showing the same data as the collars, Mace conjectures that the system—because it is somewhat of a mirror image—could, over time, be used to further monitor bear trends.

Interestingly, the more information the South Fork Project generates, the less cocksure Mace becomes. "All I do is think about this project," he says. "I might be tramping in the hills following some bear and I'm thinking about what I'm supposed to be doing and then it hits me that everything is so complex, that the grizzly bear is a complex critter and the ecosystem is a very complex place.

"We're starting to see how these bears relate to each other, and who relates with who, and who mates with who, and which bears run together. We used to think that all grizzly bear activity was related to food, but this study is showing us that isn't true. I know the bears are very familiar with each other. The males are especially familiar with every bear in the study area. In the course of a year they check out everyone and during certain times of the year they all seem to gather in a particular area. I can't tell you why they do that, but it makes me feel as if we're dealing with a society of bears. I think these bears go where they feel comfortable and their comfort level has to do with other bears. It sounds crazy, I know, but I don't mind telling you that it humbles you. It shows you how complicated all this is."

In their report, "Use of Systematically Deployed Remote Cameras to Monitor Grizzly Bears," researchers Mace, Manley, and Aune catalog a "List of wildlife genera and species detected by baited remote camera stations in 1989." In addition to grizzly bears, the list includes 17 mammals, a blue grouse, and a moth. Near the bottom of the list is this entry:

Common Name	Scientific Name	Number of Visitations
Human	*Homo sapiens*	1

It is a simple entry and the photo of the two hunters waving at the camera is somehow comic, but its message is clear: "We're here."

We are line entry data, a part of the complexity, a part of the South Fork system that is virtually governed by the grizzly bear. The report, however, shows that nearly 90% of the grizzly bears caught by the camera were caught in the highest, most remote locations. The *Homo sapiens* visit, meanwhile, was also at one of the most remote photo stations. A likely and predictable interpretation is that humans are pushing the bear to these once foreboding sanctuaries, but that's exactly when logic crashes with Mace's humbling complexity.

"Even what we call 'wilderness bears'—bears thought to live exclusively in the adjacent wilderness complex—leave the wilderness for at least part of the year. They come out," Mace says, "just as elk do, because there is habitat outside the wilderness that these bears require to survive. And that means their vulnerability goes up."

Consider that of the 22 South Fork bears collared in the past two years, six have died. One was attacked and eaten by another grizzly, one was poached, one was killed by a hunter who thought it was a black bear, and three were killed by hunters defending themselves while being attacked by the bears.

In more ways than one, the South Fork of the Flathead River Grizzly Bear Project is a race against time and 1998 seems to be approaching on a Japanese bullet train. For the South Fork researchers, a "bear year" is only six months—from May through November—which makes a seemingly lavish 10-year project a hectic five-year push to "get to the bear."

"That's what makes this job so exciting," Mace says philosophically. "You know you're going to have to charge on in there in the spring and do it quick and do it accurate because the grizzly's year is so short and you can't go back and redo anything."

Mace keeps looking out the window. Even a robin would do.■

NONGAME SAMPLER

RED-NECKED MYSTERY BIRD

by Dennis Flath

SO WHAT'S IN A NAME? In Denmark, the red-necked grebe (*Podiceps grisegena*) is known as *grastrubert lappedykker*. In Russia, it's *seroshchyokaya pagonka*. But wherever it occurs or whatever it's called, the red-necked grebe (formerly Holboell's grebe) is something of a mystery bird. It just hasn't gotten a lot of attention from the scientific community, and much of what scientists know is based on knowledge of grebes in general and on research done in northern Europe. The result? The red-necked grebes of Montana are little known and poorly understood.

Historic record in Montana is scant, but the red-necked grebe is listed as a breeding species in seven latilongs (degree blocks) in Montana and suspected of breeding in one other. Most locations are in the western part of the state, but migrants have been spotted in several locations in eastern Montana. The largest breeding group in the state is on Georgetown Lake between Anaconda and Philipsburg.

Grebes (Order Podicipediformes) are a closely related group, distributed nearly worldwide. About 18 species are known, with seven of these found in North America and six in Montana.

The red-necked grebe is distinctive and easily recognized. The black crown has two tufts of elongated black feathers, which do not contrast as in the eared or horned grebes. The back of the neck is black and the upper parts are brownish black. The chin, upper throat, and sides of the head are uniformly gray. The rest of the throat, sides of the neck, and upper breast are a rich chestnut color—from which the red-necked grebe draws its name.

Grebes seem quite indifferent to flying—they fly only when absolutely necessary and require an open-water runway to get started. But all grebes are built for swimming, and the red-necked grebe is no exception. They are adept at diving and rapid underwater swimming. Usually, they use only their feet for underwater propulsion, but during an escape dive to avoid danger, they use both feet and wings. Feeding dives generally last 15 to 20 seconds, but during escape dives, red-necked grebes may stay underwater up to one minute.

Grebes have unique feet. The bones of the lower leg are

red necked grebe JAN L. WASSINK

laterally compressed, with the leading edge sharply tapered. The result is a lower leg-foot combination that offers little more resistance than a knife blade when passing through water on the forward (return) stroke (Figure 1). The toes are lobed toward the end and webbed along the basal third. On the backward (propulsive) stroke, the toes rotate about 90°, and powerful extensor muscles provide rapid acceleration. The grebe uses its feet alternately when swimming on the surface of the water but in unison when swimming underwater.

TWO SUBSPECIES OF RED-NECKED GREBES ARE KNOWN. The European subspecies shares a common habitat with another species which is its closest relative, the great crested grebe (*P. cristatus*). Competition between the red-necked and great crested grebes is avoided by red-necked grebes in Europe adopting food habits that do not conflict with those of the great crested grebe. The European race of the red-necked grebe feeds on insects and larvae more heavily during the breeding season than does its North American counterpart, which feeds primarily on small fish and aquatic invertebrates year-round.

The North American race breeds across much of Alaska and Canada to the Great Lakes area, and in portions of Washington, Idaho, Montana, North Dakota, and South Dakota. It occurs widely in Minnesota and at least one isolated population exists in Oregon. This race is also found in suitable habitats in Russia and China. These birds winter in coastal areas on saltwater, sometimes several miles off the coast. On the West Coast, red-necked grebes winter from central California north to the Aleutian Archipelago. The other distinct winter range in North America is along the East Coast, roughly from Georgia (few in Florida) to Nova Scotia (many) and Newfoundland (few).

Fall migration occurs mainly in September, with some local and pre-migratory movements to larger lakes in late August to early September. Long flights to wintering areas are interspersed with stopovers for feeding and resting.

On coastal wintering areas, grebes disperse, making inventory more difficult than for other species. Fortunately, this tendency also reduces vulnerability to catastrophe. For example, when sea birds die because of oil spills, few red-necked grebes are listed as casualties. Lower densities allow the red-necked grebe to simply beat the odds when it comes to storms, predators, pollution, or excessive disturbance.

The red-necked grebe is said to be one of the shiest of the grebe species. Instead of nesting in colonies, rednecks form loose aggregations; each pair defends a territory. Their nests of aquatic vegetation are scattered about in areas more open than those used by western or eared grebes. The nest is a mound of vegetation with a bowl in the center, low enough that the eggs often get wet. However, the decaying vegetation generates enough heat to overcome any chilling caused by the water. Grebes are recognized for their elaborate and complex courtship rituals. Courtship often starts during migration and continues throughout nest building, egg laying, and incubation.

Both sexes incubate, with the female performing the major role. Changing of the guard in this duty is usually accompanied by a short "head-shaking" ceremony and addition of new nest material. Nest losses are common and subsequent re-nesting is routine. Thus, by the end of the nesting season, it is usual to spot young of many different ages.

Apparently breeding does not take place until age 2, so the population has a large number of non-breeders. Non-breeding birds are segregated from breeding birds. Non-breeding birds inhabit portions of large lakes not used by breeding birds or else use other bodies of water. This segregation probably helps survival along by ensuring exclusive use of brood-rearing habitat by the reproductively active birds.

GREBE CHICKS ARE STRIKING, with a series of black and white stripes on the head and neck. Like other grebes, the young are brooded on the backs of the adults until they are several weeks old. This habit helps protect them from predation by northern pike and other predatory fish. Lakes used by nesting grebes are often shallow and weedy (at least around shorelines), a

habitat also preferred by pike.

Food preferences lean heavily to small fish, with crayfish, insects, and insect larvae also important. Abundance of various prey influences food habits. Grebe speed and agility are more important than bill size in determining the kinds of prey taken.

Like all grebes, the red-necked grebe eats its own feathers. Ingested feathers serve as an auxiliary lining for the gizzard. Parents feed downy young only a day old bits of feathers.

Spring migrant red-necked grebes arrive at Georgetown Lake from mid- to late April. Arrival in Montana is similar to arrival

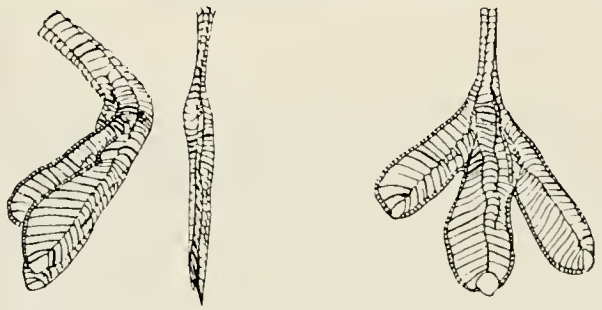


Figure 1—The grebe foot is adapted for swimming. The figure on the left shows a side and front view of the grebe's foot during a forward (return) stroke. The drawing on the right shows a front view during the grebe's backward or propulsion stroke.

records for other areas of similar latitude, but migrant rednecks don't arrive in Canada's prairie provinces until early May. In Alaska, the Yukon, and the Northwest Territories they do not arrive at the breeding lakes until June.

Almost no information is available on the size of the red-necked grebe population in North America. In most of its range, it is one of the least common grebes. Even in the heart of its breeding range, densities are low—a fact that adds an additional element of mystery to their status at Georgetown Lake.

Red-necked grebes have nested at Georgetown Lake for many years. Questions about status and trend of this population led to inventory efforts by the Department of Fish, Wildlife & Parks in both 1987 and 1989. Surveys revealed a population much larger than anticipated. While most known breeding lakes hold populations of a few to a few dozen adults, we counted 168 adults in 1987 and 201 adults in 1989. A more typical situation occurs at Ninepipe Wildlife Management Area near Ronan where a small number of red-necked grebes nest in an area also used by other grebe species (mostly western and eared grebes with an occasional pied-billed grebe). At Georgetown Lake, we saw few other grebe species (three pied-billed in 1987; 14 western and one eared in 1989).

Reasons for the seemingly unusual numbers at Georgetown Lake are obscure. Apparently, a strong population has been present for some years, but many questions remain. In many areas of North America, the species is thought to be declining. This perception is based on low nesting success and limited brood size. However, we don't see those declines at Georgetown and reproductive information compares favorably with information gathered from four other sites:

Table 1—Comparison of nesting and fledging success of red-necked grebes from various populations

Location	# Pairs	Nesting Success	Brood Size	Fledged Per Breeding Pair
Manitoba	114	50.9	1.85	0.94
Alberta Potholes	63	65.1	1.63	1.07
Pine Lake, Alberta	207	24.6	1.37	0.34
Germany	20	53.6	1.96	1.05
Georgetown (1987)	84	53.6	1.62	0.87
Georgetown (1989)	100	51.0	1.76	0.90

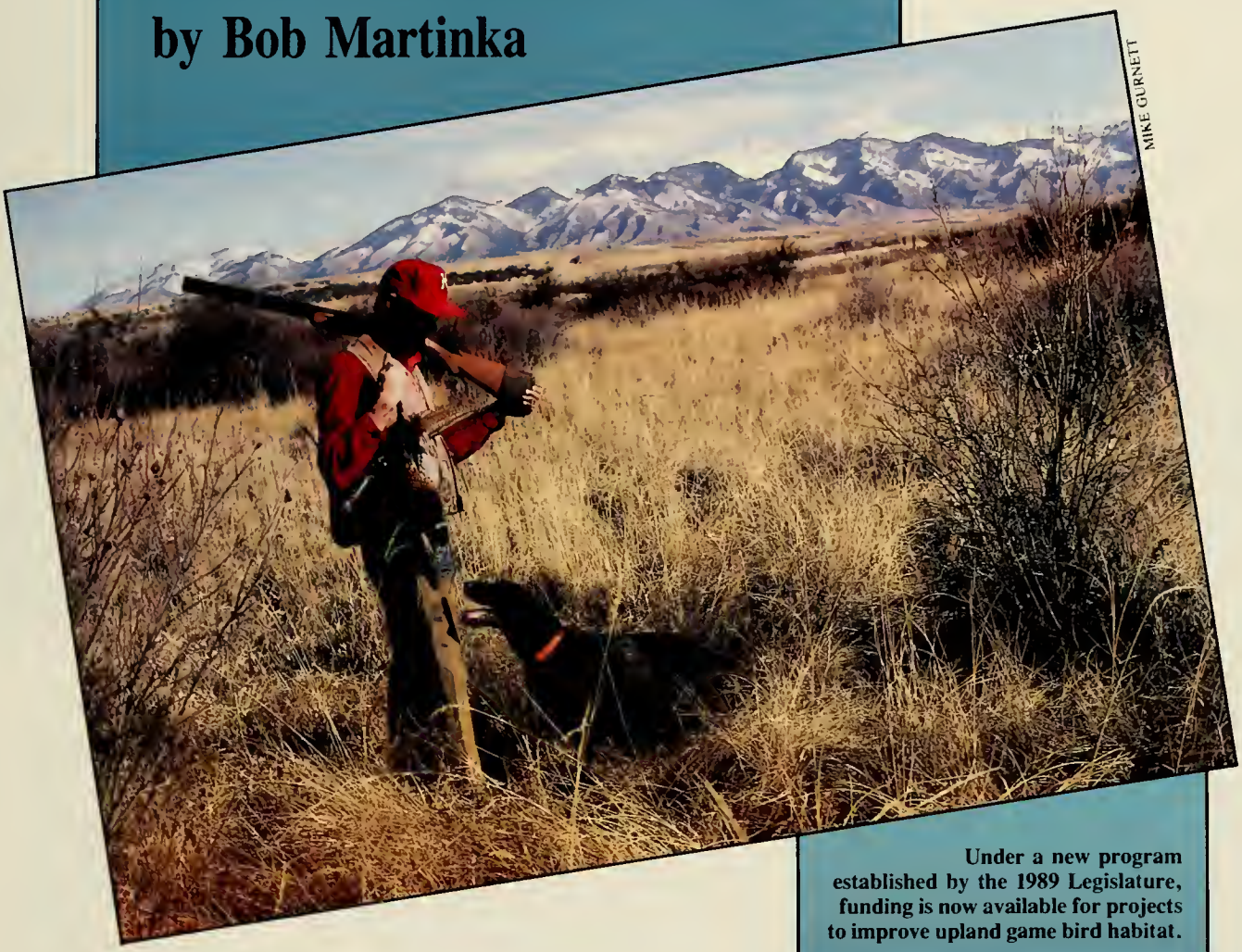
By about mid-August, when the young are off the nest (even the re-nesters), Georgetown Lake becomes the premier spot in Montana to see and photograph red-necked grebes. Other places offering the chance of excellent photographs are the Warm Springs Ponds and both Ninepipe and Pablo reservoirs.

A native Swede might know the red-necked grebe as a *grahakedopping*. But the local folks at Georgetown Lake just call them "squawkers." Regardless of the name, the fact remains: The red-necked grebe remains a unique, interesting, and somewhat mysterious part of our wildlife heritage.■

NATIONAL FISHING WEEK
June 4-10, 1990

Look to the Future

by Bob Martinka



MIKE GURNETT

Under a new program established by the 1989 Legislature, funding is now available for projects to improve upland game bird habitat.

SHORTLY AFTER WE TURNED ONTO THE GRAVEL ROAD, *we noticed some excellent pheasant cover. Patches of standing grain stood adjacent to a field of tall grasses mixed with sweet clover. Along the west edge of the grass field was a shelterbelt only a few years old. While the trees and shrubs were not yet mature enough to provide good winter cover, the future looked promising.*

We continued down the road until we came to a farmhouse. After chatting with the gracious landowner for several minutes and receiving permission to hunt, we headed back to the promising cover we had spotted earlier.

This was a special day. It was the first bird hunt for my son, Matt. The thrill of my first hunt with my Dad in 1955 is something I still think about, and I wanted Matt to have a similar experience. There were many things to be discussed and taught that day and in the many to come. Among the most important were the necessity for good habitat, respect for landowners, and an appreciation for the traditions of the hunt.

As we put on our hunting vests and readied our shotguns, we talked about which area to hunt first. Not five minutes after we started walking, things began to happen.

"Get ready, Matt! Misty's acting birdy. Stay close to her!"

"Cackle!! Cackle!! Cackle!!"

"It's a rooster! Take him!"

"Bang!"

"Great shot! Congratulations! How does it feel to get your first pheasant?"

* * * * *

This hunting story has not yet come about. But I have dreamed about it and I hope to be able to experience it in a few years when my 9-year-old son is ready for his first bird hunt. Thanks to a bill passed in the 1989 Legislature, the odds of my story actually taking place are greatly improved. The legislation directs the Department of Fish, Wildlife & Parks to implement an Upland Game Bird Habitat Enhancement Program.

That program was launched in January, and the game bird habitat established in 1990 and subsequent years should provide a solid base for increased populations of game birds in the future.

LEGISLATION AUTHORIZING THE UPLAND GAME BIRD habitat enhancement program was passed in response to requests from sportsmen and landowners who recognized suitable habitat as the key to maintaining and increasing Montana's upland game bird populations. Upland game birds include three species of mountain grouse, sage grouse, sharp-tailed grouse, pheasants, Hungarian partridge, and turkeys. Habitat enhancement opportunities will be greatest for game birds such as pheasants, huns, and sharptails commonly associated with agricultural lands. However, habitat improvement projects for all species will be eligible under the program. Opportunities for habitat projects will no doubt be greatest on private lands, but projects on public lands will also be pursued where feasible. Many landowners have parcels not suitable for farming or grazing. Under the Upland Game Bird Habitat Enhancement Program, these areas, those set aside under federal farm programs, and some public lands can potentially be developed for habitat.

Enhancement projects the program will emphasize include:

- Establishing areas of winter cover by planting trees and shrubs where no such cover now exists.
- Establishing, maintaining, or improving permanent grassland areas for nesting, loafing, and winter cover.
- Establishing dependable sources of winter food in areas of adequate cover.
- Developing grazing management systems to improve nesting, brood rearing, and winter cover.
- Restoring shallow wetlands for winter cover.

FW&P has developed guidelines to ensure that habitat enhancement projects meet minimum standards. In addition, a number of other general prerequisites and rules regarding project requirements and eligibility are applicable. Projects will be implemented by cooperators (landowners, sportsmen's clubs, and others) through leases, conservation easements, or department cost-sharing agreements with participants. Purchase of fee title to lands is prohibited by the legislation establishing the program.

Projects on private lands must be open to public hunting for upland game birds. Landowners will be able to limit numbers of hunters and areas to be hunted; however, they may not charge user fees and projects within a leased or commercial hunting operation will not be eligible for funding. In most cases, projects can be initiated immediately after a contract is approved by a department representative such as a field biologist. Approved projects will be funded first-come, first-served.

WHO PAYS AND HOW MUCH? The Upland Game Bird Habitat Enhancement Program is funded by sportsmen's license dollars—$2 from each resident game bird and sportsmen's license, and $23 from each non-resident game bird and big game combination license. This funding level will provide about $500,000 per year for the program.

Cost-share payments for completed habitat projects will usually be limited to $3,000 per landowner or project per year. However, exceptions are possible. Activities and expenses that qualify for cost-share payments include items such as seed, trees, and shrubs, and activities such as cultivation, preparing the ground for seeding, seeding, fencing materials, leaving some crop areas unharvested, and other habitat improvement costs.

Where projects are eligible, federal cost-share funding may be sought by landowners under programs such as the Conservation Reserve Program (CRP) and others. When matched with Upland Game Bird Habitat Enhancement Program funds, little or no cost may accrue to participants in habitat improvement practices. However, in no case will total cost-share payments exceed 100% of the total project cost. Where other sources of funding are not available, in-kind services such as labor may be used for the program participant's portion of the cost share. Where suitable habitat already exists or is being developed through the habitat program, the department has a related program that pays interested landowners and groups for the release of pen-raised pheasants.

FEDERAL FARM LEGISLATION AND PROGRAMS will continue to have a major impact on upland game bird habitat in Montana. However, the Upland Game Bird Habitat Enhancement Program will provide the basis and the funding to improve habitat over many parts of Montana for many years to come. If it is successful—and we have every reason to believe it will be—game bird populations will increase and the dreams of future generations of hunters will be fulfilled. My dreams and expectations of bird hunting have been realized. Now it's Matt's time!■

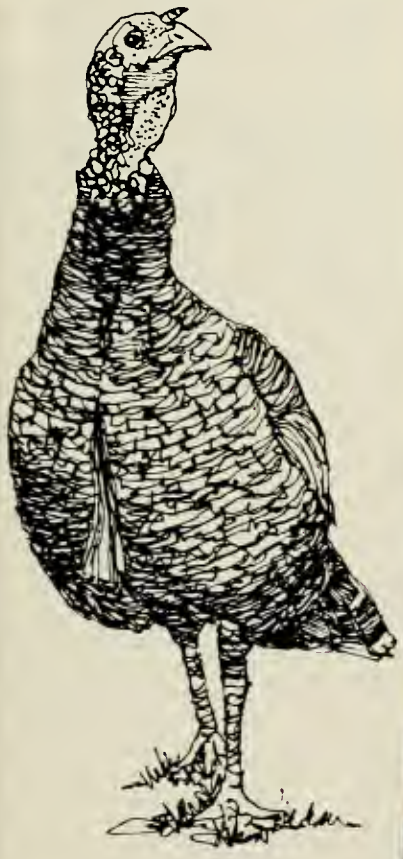
* * * * *

- *Are you interested in participating in the Upland Game Bird Habitat Enhancement Program? Contact your local FW&P office or the Wildlife Division in Helena (1420 East Sixth Avenue; Helena, MT 59620, 406/444-2612).*

JON CATES

Hungarian partridge, pheasants, turkeys, and grouse will be the beneficiaries of plantings to establish better food and cover conditions.

MICHAEL AND PATSY FRIBLEY



High Plains

Land measured not in acres but in miles,
Ice and wind-beveled to an endless plain;
You can be lovely with soft summer smiles
Of coulee roses, and the rippled grain
In ribbons tied to houses beyond view
In hollows, sheltered from the constant breeze;
Snug people places, small and far and few,
With silver Butler bins instead of trees.

Plow-broken long ago, you are unchained
For antelope that match your beige and brown.
A harsh land, where the few and strong remained,
And bunch grass tufts still pin the pastures down
That young men walk with bootsteps gumbo stained;
The old men huddle round a stove, in town.

—Marion Gebhart

MIKE LOGAN

MIKE LOGAN

MIKE LOGAN

DIANE ENSIGN